

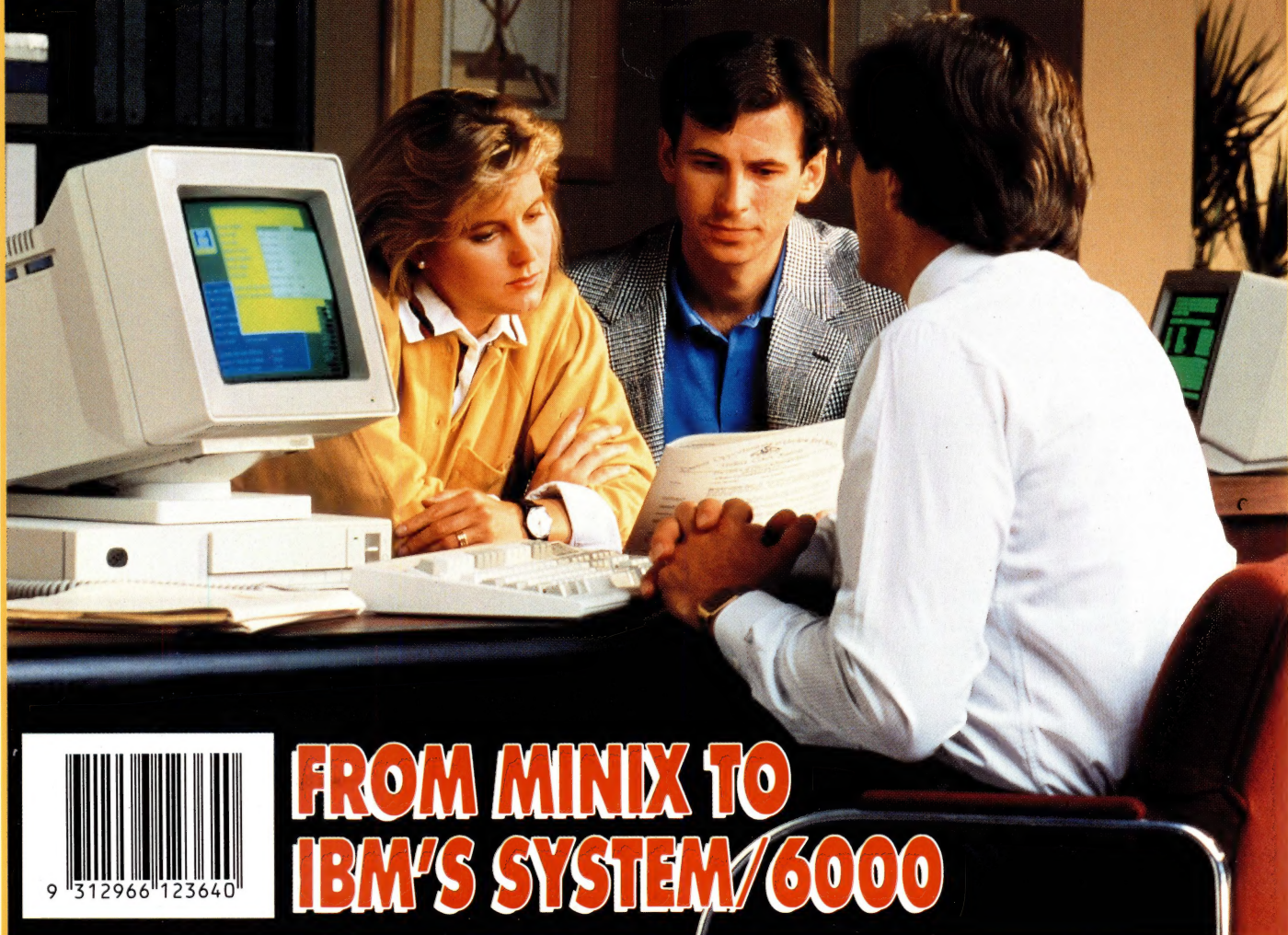
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JUNE
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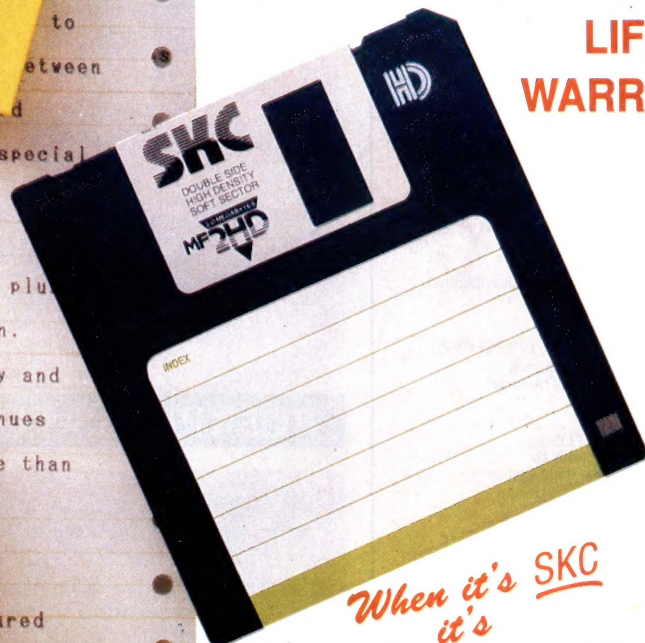
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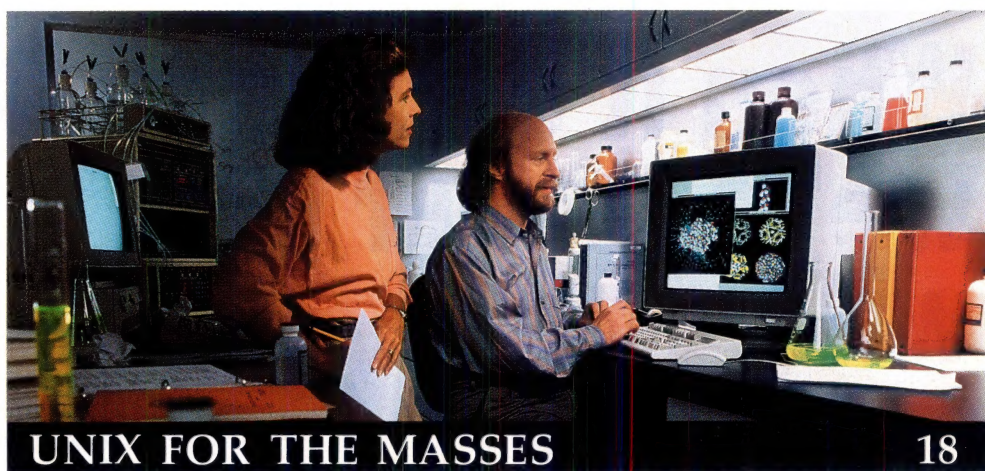
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PCEXPRESS FOR PCPOWER

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IN JULY WE HAVE our annual feature on Desktop Presentation which has now gone well-beyond vanilla desktop publishing and moved into a smorgasbord of colorful flavors. OCR and image scanners, color printers and slide makers, genlocks for desktop video, business graphics software, screenshooters and PC-to-film recorders, even wordprocessors, have moved into the 'high' end of presentation at prices that are coming down fast. And – we have some 'computer observations' that will make you think, plus the tale of 'How a Hobby Became a \$500,000 Business.'

This month's cover: Photograph of the System/6000 courtesy of IBM Australia; design by Sally-Anne Silveira; border by Jake Kennedy.

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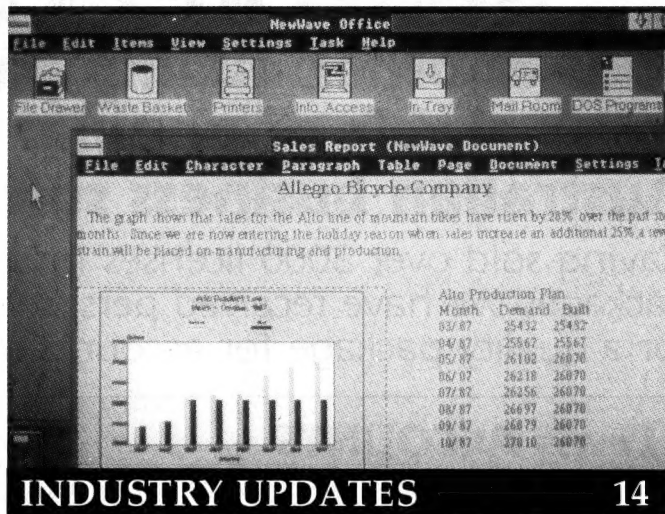
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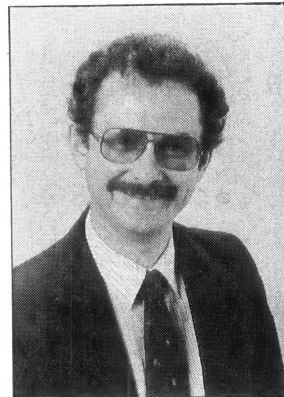
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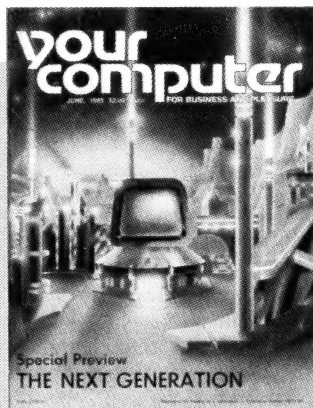
Almost eight

THIS ISSUE is the last of YC's eighth year: in July we will be nine years old. In the June issue seven years ago, Les Bell noted, 'There's no doubt that technology is moving faster and faster every year. If I may use economics as an analogy: inflation is the rate of change of the value of the dollar. Well, not only do we have technological inflation, it's getting worse.'

And worse ... let's look at some of those seven-year-old predictions – not in judgment of Les (now amongst the most 'established' and respected of PC-market gurus), rather as an overview of how the perceived market-to-be then, met with reality.

'I predict a new wave of brief-case size computers [with somewhat limited functions]: that was certainly true for several years after, and then the development of low-power consuming CMOS chips, coupled with other 'miniaturising' breakthroughs gave us brief-case (and notebook!) sized machines matching most desktops.

'The Smalltalk environment [which] is brought to fruition in the Lisa is an important breakthrough. ... Other manufacturers are bound to follow with similar machines.' Yes, the innovative ones did, but



June 1983

Formula International, dsitributor of the Pineapple computer, has been restricted from copying or selling any of Apple's ... programs stored in ROM– *News*, p7.

The Apple III microcomputer with 256K of memory will be reduced to \$3499 ... production of the 128K system will cease when inventories have been emptied – *News*, p16.

[To what extent] will the use of icons inhibit the user from grasping more sophisticated and more powerful concepts which are peculiar to working with computers? – *Computer of the Year Awards*, p32.

it's only just now catching on in the 'mainstream'.

'The other major breakthrough which Lisa represents is integrated software ... Lisa provides full integration through its operations analogous to paper and scissors.' At least we've gone beyond the clipboard – Dynamic Data Exchange (DDE) and 'warm links' are readily available. I think DDE (as in HP's NewWave) and Hypertext are two of the most significant conceptual breakthroughs we've seen in computing – and couple that with Object Oriented Programming: we should see some powerful products in the next generation. By that I mean those conceived to use those concepts, rather than have them tacked on in version 7.90a.

'In the next year, we can expect to see companies with spreadsheets ... moving to provide integration.' Lotus 1-2-3 has just been released, and was shortly to be followed by Open Access and a host of others. But it has taken a long time for the integrated perfection of Framework and its ilk to emerge in the IBM world. (What ever happened in VisiOn and Starburst?)

There's more, but I've run out of space. Things seem to be moving along pretty well as expected, though. Next month, we'll try a few predictions. □

Future Features

IN ADDITION to our application stories, news and other informative pieces, each month we present features designed to keep you informed about the world of personal computing –

August 1990

Monitors: Whether you want to upgrade your PC or Mac monitor to color, add a VGA card, improve resolution or find a monitor to use with your portable or new system, our survey will clarify the jargon and bring your choice into focus.

September 1990

Entry-level PCs and Networking: As the price of power drops, the low-price machines have become more powerful and now offer more to small business users. Our survey and guide to PC purchasing will show you how to match a system to

your needs. Also in this issue is a special feature on understanding, choosing and implementing a PC network.

October 1990

Communications: Our indepth coverage of electronic communications will tell of the latest developments in 'connectivity' and present an overview of the hardware and software that's bringing it all together – from the latest in modems and fax cards to the vast range of online services.

November 1990

Graphics: With the power now available to most users, graphics are being used more extensively and imaginatively than ever before. With emphasis on small business applications, we'll describe the exciting changes now taking place in computer graphics. For the real graphic power user, there will be a special feature on transputers and RISC-based machines.

December 1990

Integrated packages: Our survey of the latest full-featured offerings highlights the strengths and weaknesses of this growing range of flexible applications. This issue also features project management software and the latest in handheld computers.

January 1991

Computer of the Year Finalists: This survey of 1990's best in hardware and software is the best guide for users to current market directions.

Application stories – particularly those with the same theme as our features – are always welcome. Because of lead times, material must be received at least eight weeks prior to the month of intended publication. Please address editorial enquiries on our features to Mark Cheeseman, (02) 693 4143, and advertising enquiries to Mark Wilde, (02) 693 6646.



HOWARD
KARTEN

Unix

LIKE EVERYONE ELSE, I'm reasonably confused by Unix. What is 'reasonably'? That's a good question (especially for someone like me who's not infrequently in that state), however, in this case, it means knowledgeable enough to have a vague idea of how Unix differs from other systems, but not knowledgeable enough to understand fully what the fuss is all about. From my readings about Unix, it looks like there are strong elements of theology here, though I will admit to being a little vague on how many programmers can dance on the head of a Unix platform, and just who the pinheads are.

Some of the critical things I've been able to divine from the writings of the cyber-theologians is that Unix is almost like being in heaven, at least for developers, and avoids all that boring, painful stuff like self-denial. And, there is one tiny little problem, it's so tiny, really, I almost hate to mention it – Dos already represents a foretaste of hell to many ordinary computer users, so they will probably have no difficulty restraining their enthusiasm for something which is two orders of magnitude more complicated than Dos. Also, the squabbles among proponents of different flavors of Unix – AIX, Posix, Berkeley Unix and so on, are at least as much fun as any other internecine difference of opinion, though as yet, no deaths are directly attributed to this fight. Unix, of one denomination or another, is a commercial reality, and ordinary members of the flock – that is, users (why do I keep getting thoughts of sheep being sheared?) are happy with it and expect to see more Unix applications, because of the portability it offers.

Friends who use Unix tell me that it is a much more 'interactive' way of communicating with a computer, and thus much more appropriate to the PC era than, say, IBM JCL was. (I realise that 'JCL' is an unknown term – church elders and other geriatric types will be happy to explain it, and happy that you asked them.) Unix is also said to be a great toolkit, good for networked applications, great for standards and portability, but weak on security.

Mentioning AT&T is as good a way as any to change the subject somewhat, to

the US telephone system and a brief discussion of some of the services available here via the telephone system.

AT&T's settlement

IN 1984, THE US Justice Department and AT&T settled a long-running anti-trust suit. Up to that time, in effect, AT&T high priests had claimed they had the only true channel to salvation – er, communications. One result of that settlement was that AT&T was broken up into a company offering regulated (tariffed) long-distance service, non-regulated services and products (for example, computers), and seven Regional Bell Operating Companies. Another was some major changes in the technological, as well as the regulatory, environment of the US telephone system; the ubiquity of credit cards, computers, networks, inexpensive PCs, and tone-generating telephones here all coalesced to create some interesting services.

For starters, US telephone consumers can now choose from among a multitude

Unix is almost like being in heaven.

of long-distance carriers. The leader is AT&T, with around 69 per cent of long-distance revenue, followed by MCI with 12 per cent, and US Sprint with 8 per cent.

All telephone consumers must choose a 'primary', or default, carrier for their long-distance traffic. This is the carrier which gets the business if the caller takes no other action to give the call to another carrier. A caller does that by dialing the alternative carrier's access code ahead of the telephone number. For example, when I wish to put a call on MCI's network, I dial 10222 before the other digits; Sprint's access code is 10333, and so on.

For several years, customers of alternative carriers – but not AT&T – have been able to bill calls from public phones to their home or office phones automatically, by dialing an alternative carrier's country-

wide number and punching in their account number. AT&T has only recently started this service in selected areas of the US; by and large, AT&T customers must still read their AT&T account number to a human operator – a good way to broadcast it to some of the larcenous folks who hang around pay phones just to learn those numbers.

One of the services we've had for a long time is '800', originally called In-WATS (Inward Wide Area Telephone Service). With this service, the caller is not charged; instead, the call is billed automatically to the called party which is usually a business. A recent addition to US services is the one called a '900' number – that is, it has an area code of 900. (US telephone numbers are 10 digits long, with the first 3 digits called the area code. Every state has at least one area code, possibly more, depending on the number of telephones in use in the state. The '1' preceding some of these numbers is really a kind of telephone company mechanical requirement and is not formally part of the number.)

You would call a 900 number to order goods or services which you've seen advertised, and your order is charged to your telephone number. The telephone company bills the caller and forwards the proceeds to the advertiser – that is, the number's owner. Some TV programs also use these numbers to do 'online' polls – 'to vote 'yes', call 900-555-1111; to vote 'no', dial ...

A closely related development is the ability of the telephone network to transmit to the called party the calling number. Some department stores already carry a device which you attach to the phone which displays that number, and it has aroused quite a heated debate on the privacy aspects. Those concerned about privacy argue that this service might inadvertently expose a caller. For example, an individual who calls for a 'free' booklet will inadvertently reveal his telephone number, opening him up to annoying telephone solicitations; or a woman calling her estranged, battering husband for child support payments might inadvertently lead him to her – the other side argues that this service would eliminate harass-

ing phone calls. The issue has already been covered in our mass media, and argued back and forth in letters-to-the-editor. It does not yet seem to have dawned on anyone that the same computer technology that makes this possible, could also be used to block the transmission of the number — it's simply a question of how it's programmed.

It's still a tad early for our esteemed legislators to have figured out where in this issue the votes lie, but given the unerring ability of legislators to get involved where they're not wanted or needed (and where their 'input' will only further gum things up), that's a reasonable expectation.

Tone-generating phones

THE TONE-GENERATING phones now found everywhere also have two buttons called '*' and '#'. To compress a long story, the telephone company is widely believed to have invented those buttons long ago to overcome objections by the Federal Communications Commission (the federal regulatory body) that tonedialing benefited only the telephone com-

Dos already represents a foretaste of hell to many ordinary computer users.

pany, not consumers, and therefore the phone company could not charge extra for this service. In any case, the '*' and '#' make it possible to insert delimiters into numbers entered over the phone. This, in turn, makes it possible to do things like call your bank to learn your current balance.

It has also made possible the rise of automated telephone attendants. More and more, switchboard attendants in businesses are computers — they answer, you punch in the desired extension, and the machine will track down the target, or let you leave a message in the appropriate voice mailbox. It can be retrieved, of course, by touchtone, even from an outside phone.

The AT&T designed mainframe comput-

ers which in many cases are running Unix software, have led to a proliferation of interesting services here, and sometimes they are even helpful. 'Call waiting', for example, gives you a little 'click' to alert you to an incoming call while you are on a call. You have the option of putting the current call on hold to pick up the second call, or ignoring it. That click takes only half a second or so, which is enough to make a modem go berserk and drop its connection. If you happen to be talking to the person who has that service, the implied rudeness is enough to make you go berserk. Call waiting can be temporarily disabled in some areas — but not all!

Related services are call forwarding which automatically forwards your call to another number, and 3-way calling. The latter, incidentally, was actually discovered and pioneered by telephone hackers who discovered certain numbers in all exchanges could be used for that purpose. At first, telephone companies tried to stamp out this bit of tomfoolery, but instead, they jumped into it in a big way when it dawned on them that it could be used to make money. □



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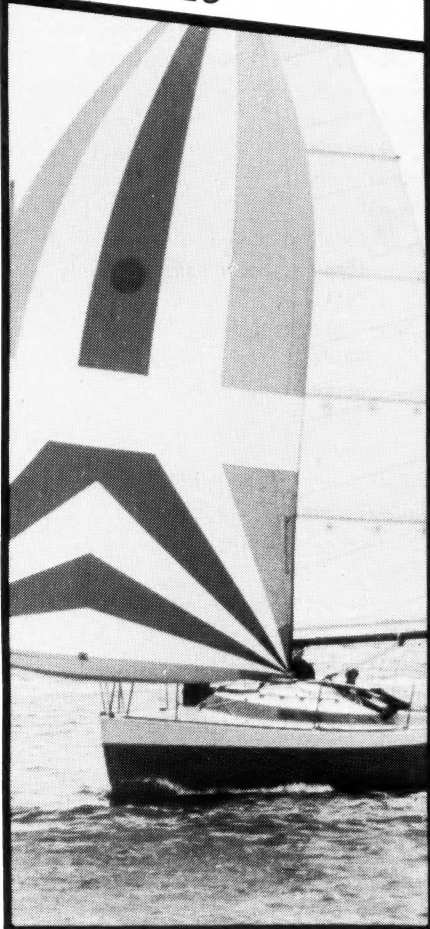
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```
GOTOXY(3,NumItems+4);
Write('Then press (Enter)');
ColorWord(X1+13,Y1+NumItems+3,7,4);
DriveIt(X1,Y1,Width,NumItems,$OF);
end; { of procedure 'MenuSetUp' }
{-----}
Begin
  ScrnStart := ScreenSegment;
  TextAttr := $1F;
  ClrScr;
  LinePos := 1;
  MS1 := 'Apostrophes/Commas/Full Stops';
  MS2 := '/Edit/Display/Semi-Colons';
  MS3 := '/Colons/Program Information/';
  MenuString1 := MS1+MS2+MS3;
  MenuSetUp(10,10,' Menu ',MenuString1,
    $70);
  Delay(1000);
end.
```

Listing 1. The code for a driving procedure that works in conjunction with MenuSetUp which was described in YC, January 1990.

As you can see, the arrow keys #72 (up), and #80 (down) are read in a nested case structure. Hitting a so-called extended key on the keyboard produces a #0 character first (and always), hence, in this case, we are guaranteed that the next code retrieved by ReadKey will be that of the extended key which was pressed. Pressing either key immediately resets the current item to normal text and background. Then it decrements (or increments) the Row of the menu it is on and calls InvertItem to highlight that row. If the Row is less than 2 or greater than NumItems, we have obviously run out of menu in the up or down direction, and Row is re-assigned appropriately (for example, if we run off the top, Row is re-assigned the value of NumItems, and the bar wraps to the last item in the menu). All of this is enclosed in a Repeat ... Until loop, and the exit condition is the pressing of the Enter key. The menu then disappears, and other things (in a real program), start to happen. In Listing 2, my short main program has a one second delay, and hence, does not disappear too quickly – for demonstration purposes only.

Two more procedures, so far not mentioned, are included in Listing 1, these are: ColorChar and ColorWord. These procedures take screen coordinates (X1,Y1), and a byte value (for example,

\$10) as parameters. The ColorChar procedure then performs a logical OR with this byte and the value of TextAttr, and stores the result at the attribute location associated with (X1,Y1). The procedure ColorWord needs a parameter, Len, to tell it how long the word is. However, apart from that, it is a simple FOR ... DO loop. Hence, to color a character or word such as Enter, we simply need to call one of these procedures with the appropriate parameters.

```
{-----}
Begin
  ScrnStart := ScreenSegment;
  TextAttr := $1F;
  ClrScr;
  LinePos := 1;
  MS1 := 'Apostrophes/Commas/Full Stops';
  MS2 := '/Edit/Display/Semi-Colons';
  MS3 := '/Colons/Program Information/';
  MenuString1 := MS1+MS2+MS3;
  MenuSetUp(10,10,' Menu ',
    MenuString1,$70);
  Delay(1000);
end.
```

Listing 2. An example of a main program 'body' using the MenuSetUp procedure described in YC January 1990, plus a few colors. Use it in conjunction with the code in Listing 1 to produce a working, popup menu.

Summing up

YOU WILL find this code is quite acceptable for implementing one menu, in isolation. Or, indeed, any set of menus where a single menu is displayed at a time. For sub-menus, or 'chained' menus, life is not so easy with this code. We would have to move into the treacherous depths of records, and 'chained' records, to implement multiple sub-menus, which is beyond the scope of this article.

Finally, those of us with memories that extend back to September last year will recall that we have now followed a neat implementation path, beginning with efficient memory usage for windows, and now applying those efforts to a practical user interfacing problem. Perhaps, in future issues we may be able to examine how pointers can be used to implement large data structures, albeit not involving windows. □

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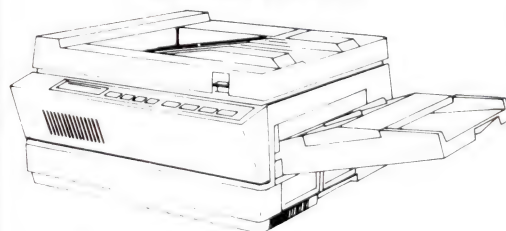


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WILLIAM OLSON

From heritage to electronic voting

ONE OF AUSTRALIA'S largest Amiga mail order software operations now has a walk-in store at Tuggeranong for Canberra Amiga users. Kim Mars, owner of Interlink Software, says his business has expanded rapidly since opening early last year.

Traditionally, mail order buyers have not trusted the postal service because, as Mars said, in the past there were mail order software dealers around who gave the industry a bad name. 'For instance, there were cases of companies taking money off software buyers when they had no stock to sell them.'

According to Mars, service is important to mail order buyers because they cannot see the products they are buying. 'I believe that success in the mail order market is basically to do with confidence. I can honestly say we have never lost an order in the post.'

Asked about the relative high price of software, he said that Amiga buyers were quite often getting software at the same retail value as the American price in US dollars. 'This effectively means it is 20 per cent cheaper for Australian buyers because the US dollar is dearer than ours. Of course, you still get people who see discount prices in US magazines and want the same deal here. However, the Australian market is not large enough to support big price reductions.'

Mars believes software prices will fall significantly when piracy stops. 'My response to complaints about software prices in Australia is that if everyone bought their software instead of using a copy, then prices would fall. The more software *actually* sold means that the Australian market will be more respected by overseas suppliers. It's an economic reality that the more you sell, the lower the price can go.'

'In the 11 months since we started, I have been able to move into larger premises at Tuggeranong, extending the operation to a shopfront as well as employing two additional full-time staff.'

According to Mars, the computer mail order business is now starting to mature in Australia. 'I realised last year that the Commodore Amiga computer in particu-

lar, needed a solid Australia-wide software supply service backed by knowledgeable staff. Jeremy Wilson, David Bateman, and I, are able to guarantee a high level of customer support because of our years of experience in the computer business.'

Interlink's business is run on four Amiga 2000s each with 40Mb hardcards and 3Mb of RAM. The software used is a totally in-house written system based on Superbase Professional. Mars, who has worked as a programmer, says he has a lot of respect for the Amiga's advanced operating system. He's about to network the Amigas with a new product he has on trial. If successful, he will be hoping to sell the network cards later this year.

Heritage commission on line

KATIE SAXBY, systems manager for the Heritage Commission, says there are now about 18,000 entries on their database, and that the commission has installed a new McDonnell Douglas minicomputer. 'We were running our database on DASSETT's Sequel system until that department adopted cost recovery procedures. We then found buying the series 18 mini from McDonnell Douglas cheaper than leasing from DASSETT.'

The commission's new minicomputer has 300Mb of disk storage, with the present database occupying about a third of this. The database program is in 4GL, with the mini operating on a Pick-based Reality system. There are 15 terminals on the system, plus three Cleveland PCs, however, it can expand to over 100 terminals. The modem is from Scitex and operates at up to 2400 baud.

Database searches can be through user friendly menus or with a natural language program called English. Anyone wanting to find out more about Australia's past can now dial up the commission's database for detailed listings. 'The dial up system only started recently,' Saxby said, 'however, at present, we are offering it as a free service. Anyone who would like access only needs to write to us for registration.'

When it first started in 1977, the commission used Csironet, and in those early years Saxby said there was an immense amount of data collected. 'What we are now finding is that we need to work on filtering those early entries so as to provide more details. Our first registration forms did not ask for all of the information we now think should be available. The form we use now is 13 pages long.'



'I believe that success in the mail order market is basically to do with confidence. I can honestly say we have never lost an order in the post.' — Kim Mars, owner of Interlink Software.



At a recent invitation only product afternoon held at the new Canberra Convention Centre, Zenith launched their new EISA 32-bit '386 PC. Will it be a hit?

Saxby said that anyone could nominate a place for the National Estate Register. A strict set of criteria controls listings, and the standards are not the same as those of state national trusts, for example. 'The heritage places can be natural, historic, or of aboriginal significance.'

When the commission accepts a listing, it's first entered on the database in an interim list. If, after three months, there are no objections, the listing is then added to the register.

An additional feature being planned will give precise map references on each listing. For natural or aboriginal features, the maps will scale 1:100,000 or 1:250,000. For features in cities, it will be 1:50,000.

Eventually, the commission hopes to use scanners for storing maps with the other data. Some of the aboriginal listings in the database do not give complete information because of problems with destruction of sites. There are only 686 aboriginal sites listed with the commission, although Saxby says there are many others listed with state departments which are not publicly available. 'Aboriginal sites are a sensitive area because of the potential damage from vandals.'

Most of the requests for information comes from local councils because they need to know about sites when adopting new town plans. The commission hopes to make some of the information available on CD ROMs in the near future.

Zenith on show

FOLLOWING THE trend of other computer companies such as Commodore and Fujitsu, Zenith held an invitation only product afternoon recently at the new Canberra Convention Centre. The show included

talks on the Zenith EISA 32-bit '386 PCs, the well known laptops, and the Z-1000 minicomputer. Roy Baker, national sales manager for Zenith, said that the company was fairly small in Australia with little more than two dozen employees. However, they still managed to make over \$24 million dollars in sales last year. 'We believe in selecting our dealers very carefully, keeping the numbers small, and backing everything we sell as fully as possible.'

He said that on an international basis, Zenith was the second biggest computer company. The Z-1000 minicomputer has a '386 chip running at 20MHz, with space for five processor cards and up to four 32-bit 16Mb memory cards. There is also space for 150Mb and 300Mb hard drives which slide out of the machine to enhance security. As an added security feature, a key lock to stop unauthorised removal of the disk drives is included.

Zenith claim the Z-1000 to be ideal for multitasking operating systems such as Xenix. The multiprocessor kernel is compatible with the standard SCO Xenix kernel. And, any devices on the Z-1000 AT bus can access 16Mb of memory in the same way as any AT.

At the conclusion of the presentation, Kerstin Wallace, Zenith's Canberra account manager, announced the door prize: Alex Reynolds from the patents office won a Zenith minisport laptop.

Election by button?

NOW THAT THE election night has faded almost to black, one useful point about computers emerged from the event. Counting votes on pieces of paper is out of style in our instant communication age. Where many of us have PCs that now rival the mainframes of a decade ago, it seems incongruous that Australian elections are still relying on bits of paper for vote counting. The result remained undecided for days, partly because vote counting is still firmly stuck in the past.

Electronic elections would speed up results, give less chance for mistakes, and possibly cost a lot less to organise once the initial computer equipment was installed.

Wouldn't it be simple to walk into a polling booth and make your selections on some function keys, and then hit the enter key? Your favorite politician could then be installed or kicked out of office instantly. We have been doing our banking for years now on ATMs so surely the voting system could cope with computerised choices at the touch of a button. □

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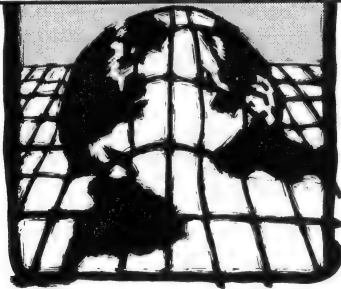
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INDUSTRY UPDATES



Expert weather system

THE STATE Electricity Commission of Victoria (SECV) and the Melbourne Bureau of Meteorology have begun developing expert systems designed to analyse and predict weather patterns. The systems rely on a blend of traditional (von Neumann) and neural computing. Fujitsu Australia is providing both organisations with free software, training, and \$60,000 to spend. It is also the first use of Fujitsu's Neurosim/L neurocomputer outside Japan.

Both systems will be built with Fujitsu's mainframe-based Eshell/SB expert system. The Bureau of Meteorology system is designed to help forecasters make better long-term weather predictions, and the SECV is developing an expert system to run generators more cleanly and economically. At present, SECV operators control generators to minimise emission of particles and gases and maximise the amount of energy. Correct settings may involve many scientific disciplines and years of practical experience.

Neurosim/L, which runs on a Unix workstation, is used to analyse large amounts of noisy and ambiguous data, and deduce rules from that analysis. The SECV will feed data from monitors on the generators into the neurocomputer. The Bureau of Meteorology will use it to analyse historical data for underlying patterns and expects to have a system prototype ready in June and a completed system within two years. The SECV should complete its research into the feasi-

bility of the technology by August.

Fujitsu Australia's manager of artificial intelligence, Andy Horsfall, said the SECV and Bureau of Meteorology had been selected as R&D partners because the projects would appeal to a wider market. 'It demonstrates that Australia is quite capable of tackling problems that are baffling everyone else in the world,' he said. □

Leading in EDI

GOOD NEWS for the future of electronic data interchange (EDI) in Australia came from two sources recently. The first was a survey of awareness among large corporations of the advantages of EDI. According to the surveying company, BIS Shrapnel, the results were so encouraging that it was suggested Australia could become a world leader in the adoption of the technology.

Further encouragement came from Dick Schneller, managing director of National Electronic Interchange Services (NEIS), who said EDI was thriving in Australia: 'We are accepting it more readily than overseas countries, including the US, and the number of companies using electronic trading systems in Australia is increasing. This is in turn increasing our overseas trade associations, and is a healthy development for the industry and Australia generally.'

The BIS Australian survey showed that some 45 per cent of the relevant target audience (office automation and telecommunications managers) were able to satisfactorily define EDI. 'These figures speak remarkably well for the prospects of EDI in Australia,' said Peter McBurney, manager of BIS Shrapnel's Information and Communications Technology Unit. He further noted that 'We tend to be early adopters of new technology generally and, perhaps largely thanks to the fact that the Australian industry is relatively highly concentrated, we are no laggards in the case of EDI'

McBurney also said the re-

search had found that 69 per cent of companies in the Asia/Pacific region (including Australia), planned to develop and implement EDI networks. Of these, 27 per cent either planned to do so by the end of this year, or were already doing so. 'The figure of 69 per cent compares with just 50 per cent of North American companies.' □

719Mb CD for Macs

CALIFORNIA-BASED Quantum Leap Technologies claims that its CD-ROM disk, packed with 15,800 files gathered from user groups and bulletin board systems across the US, is the largest CD-ROM collection ever produced, and it costs only US\$99. The company's 719Mb CD7 disk overcomes several technical barriers to putting this much data

on a disk slated for the Mac to read. First, the Mac limits the number of resources that can be addressed in a single volume, and secondly, 719Mb on a single disk is more than standard CD-ROMs can handle.

The Macintosh file limit barrier was overcome, says Robert Burr, president of Quantum Leap, through some innovation on the part of his programmers, and he has few good words for Apple on this matter: 'In spite of the fact that Apple has been marketing a CD-ROM drive for over two years now, they have refused to address the problem of the Finder crashing on large disk drives. Like many other CD-ROM developers, we've been working for months on an acceptable solution to this problem.'

Packed into 719Mb are 2570 art files, 931 games, 828 Hypercard stacks, 1262 demo files, 1180 sound files, 1453 music files, and over 1000 utilities. □

Acer in Oz



Dr Terry Metherell, NSW Minister for Education (left) with Stan Shih, the founder of Acer Computers (centre) and Roger Hausler, managing director of Acer Computer Australia, at the launch of Acer's local office.

ACER COMPUTERS, well known in Australia for the former Multitech (now Acer) range of computers distributed by Dick Smith Electronics, Datamatic and Remington, has opened an office in Australia. Roger Hausler, the newly appointed managing director, noted on the occasion that 'Acer is currently represented in more than 70 countries and annual sales in 1989 were US\$702 million and are soon to break the US\$1 billion mark. During the last five years, Acer's sales have grown by a massive 80 per cent annually.'

In 1986 the company gained prominence when it introduced a 32-bit computer ahead of IBM. More recently, Acer was the first to start

shipping a 33MHz 80386 machine. The Taiwanese company was founded in 1976 by Stan Shih and a small group of friends with US\$25,000 – the idea behind the venture was that 'the microprocessor ... could create a second industrial revolution' and the founders wanted to be at the forefront of it.

Shih, seen as a visionary by the industry, said at the announcement of the new office, that 'Companies must be global in scale, yet local in flavor.' Recently, while in Europe for CeBIT, and motivated by a European ad of Tandy's that showed a wooden dummy (Taiwan PC) next to a smiling, friendly looking man (US-made) under the heading 'Do Not Take a Risk with Clones Made in Taiwan', Shih said it was time for Taiwan bashing to stop.

In response, as president of the Taiwan BIPA (Brand International Promotion Association) he oversaw the placement of an ad explaining that many top computer companies including IBM, Apple, Digital Equipment, Hewlett-Packard, and even Tandy itself, are big buyers of OEM (original equipment manufacturer) products made in Taiwan.

Acer Computer Australia is located at Suite 8, 10 Old Castle Hill Rd, Castle Hill 2154 NSW; (02) 899 6644. □

Dealer Boycott Urged

THE AUSTRALIAN Computer Dealer's Association (ACDA) has recommended a dealer boycott of manufacturers that do not offer at least 12-month hardware warranties to end-users. Under the current system, ACDA Chairman Albert Hadid claims that manufacturer's warranties often run from the date of shipment to the distributor. By the time a machine has passed through both distributor and dealer to the end-user, a sizable portion of the warranty has already expired.

ACDA is lobbying the estimated 40 per cent of manufacturers not currently offering all end-users a minimum 12-month warranty from the date of purchase. In a blanket mailing to the non-complying suppliers, Hadid has recommended that 'those manufacturers who are not willing to assist the reputable distributors to facilitate the minimum requirement should be actively canvassed and discouraged by all.' The letter further requests that 'like-minded dealers turn their attention towards doing business with manufacturers who are happy to comply.' □

Gartner Group confirms slowdown

US-BASED Gartner Group, computer industry researchers, has confirmed what everyone has been suspecting since early this year – the computer industry is slowing down. The company reports that the US information industry vendors announced revenue growth of 5 per cent in the fourth quarter of 1989, when judged against a year earlier, while in 1988 the fourth quarter growth was 10.7 per cent over 1987.

The data was compiled from 216 publicly held companies in data processing (computers, software and peripherals), telecommunications and electronic products.

Specifically, other findings included:

□ Mainframe and minicomputer vendors suffered the worst: net margins sank to record lows of 3.7 per cent and 3.4 per cent for 1989, down from margins of 6 to 10 per cent in previous years. Microcomputers held a 7.4 per cent margin, about the same as the two previous years.

□ The revenue growth rate for desktop computers slowed; fourth quarter growth was down to 9.3 per cent over the same period in 1988 and 17.5 per cent for all of 1989 over 1988. Last year's annual growth was 24.8 per cent.

□ Software revenue growth, historically around 20 per cent, fell to a record low of 6.2 per cent in the quarter. □

ACC'90

THE AUSTRALIAN COMPUTER Conference 1990 (ACC'90) will be held at the Conrad Hotel and Jupiter's Casino on the Gold Coast, September 5 to 9, 1990. Hosted by the Queensland branch of the ACS (Australian Computer Society), the conference has as its theme 'Designing and implementing computer systems with multiple CPUs, operating systems and networks'.

Keynote speakers include David Hill, market development manager for Bull HN, who will speak on 'Networking using smart cards in the health industry'; Rod Mathews, director of ICL's network systems ('Electronic business in the 1990s'); Digital Equipment marketing manager Fred Balfour ('The networking paradigm shift: realising benefits in organisational and technological networking'); and George van Ness, US director of information technology consulting for Coopers and Lybrand ('Emerging architectures and design techniques for distributed processing').

For further information and registrations, contact ACC'90, 51 Railway Tce, Milton 4064 Qld; phn: (07) 369 7866, fax: (07) 368 1786. □

Schools short-changed on computers

FEDERAL GOVERNMENT spending on computers in public schools has fallen 86 per cent short of the Schools Commission's 1983 \$125 million recommendation. The federal government has injected only \$18 million into computer education over the past seven years.

The Australian Information Industry Association (AIIA) has revealed the huge shortfall in a discussion paper, Towards A New Approach To Computing Education In Schools. The money, the paper says, was spent as part of the Computers in Schools Programme which lasted three years instead of the recommended five.

Further, the paper states there has been no national policy on computer education since the Computers in Schools Programme ended in the mid-'80s, despite the grim skills shortage facing the local information industry. It also found the present ratio of PCs to students is one PC to every 84 primary students and one to every 54 secondary students – well behind the OECD target of one PC to every 10 students. □

Datacraft awaits the downturn

NETWORKING company Datacraft plans to ride the predicted 18-month economic downturn in Australia by focusing on tighter integration of local and wide-area networks and on OSI-compliant software development. Barry Lindsey, Datacraft's marketing manager, said the strategy was devised to meet the market's increasing need to improve connectivity between corporate minis and mainframes and PCs, following the wide take-up of stand-alone PCs and independent work-group networks in recent years. Also needed are more advanced computing services, such as ISDN, leading to a demand for higher data and telecommunications bandwidths.

'The demand for high-speed services is increasing, which requires more band-width and creates a market for higher-speed links between LAN and WAN equipment,' Lindsey said. While LAN and WAN integration will play a large part in Datacraft's business strategy this year,

CeNIT '90

CENIT ASIA '90 IS SET for Hong Kong, September 25 to 28. The concept of CeNIT differs from the West German CeBIT, held in Hanover during March each year, in that its main purpose is to familiarise attendees with new technologies. It's aimed at middle managers who are involved in and at various user groups such as bankers, engineers and even secretaries.

There will be 10 national/regional pavilions set up to accommodate international exhibitors and a number of international conferences and meetings have been scheduled to be held concurrently. There will also be a number of computer competition events such as Computer Go, Computer Chess, Electrical Mouse Competitions and a Chinese Character Input Olympiad. There will also be a Unix pavilion to promote better understanding and wider awareness of Unix, and special Education Corners on Unix and Networking presented by professional organisations like the IEEE (Institute of Electrical and Electronic Engineers). □

the company will also concentrate on OSI software development, central networking management (CNM), and network-specific applications.

Lindsey identified CNM as the next major growth area for Datacraft, as companies realise the importance of efficient central control. 'It's all to do with control of the networks and the importance of up-to-date information for major corporations,' he said, while claiming that more centralised network management will cut down the number of support people needed and increase the support function's efficiency. LAN equipment will also figure strongly in Datacraft's business strategy.

Another focal point of Datacraft's plan is OSI-compliant software development. The firm has projects in both X.400 messaging and X.500 electronic directory services, through which it aims to develop enterprise-wide network applications. □

Big three supply 44 per cent of software

ASHTON-TATE was bumped from a top-three position among biggest-selling software companies, replaced by WordPerfect Corporation during the last 12 months, according to industry newsletter 'Softletter'.

It said that Ashton-Tate has dropped to fourth place and the big three US companies, currently generating 44 per cent of all software sales are now Lotus Development, WordPerfect and Microsoft; the latter alone accounted for nearly a quarter of the total sales produced by the top hundred software companies last year. Borland dropped to ninth place from sixth, and Logitech rose to seventh from tenth place.

The hundred largest software publishers increased sales 59 per cent during the year, compared to 46 per cent the previous year. Total sales among the industry's top companies reached US\$4.053 billion dollars. The largest revenue increases were shown by Peter Norton Computing (62 per cent), Logitech (63 per cent), Adobe (63 per cent) and WordPerfect (57 per cent). □

ComputerLand Buyout

COMPUTERLAND Corporation has announced its buy-out of the last privately owned shares in ComputerLand Australia. They were held by ex-managing director Mike Boulos. The Australian arm is now said to be on the road to profitability after management restructuring. First Boulos was replaced with a US troubleshooter, and now the new, local managing director, Stefan Wasinski, is in control. □

Hypertec initiative and motivation rewarded



At the annual Australian British Chamber of Commerce Small Business Award for Export Initiative and Innovation, Sydney-based Hypertec took the honors, judged on the opening of new markets into the UK, new products developed and designed in Australia, and innovative marketing and sales techniques. Pictured, from left, are David Evans, commercial director of the company, chairman Geoff O'Reilly, managing director David Cuneen, NSW Minister for Business and Consumer Affairs, Gerry Peacocke and UK Minister of State, Lord Brabazon of Tara.

SYDNEY-BASED PC enhancement board builder Hypertec won the annual Australian British Chamber of Commerce Small Business Award for Export Initiative and Innovation. Entrants are judged on the opening of new markets into the UK, new products developed and designed in Australia, and innovative marketing and sales techniques.

Hypertec began trading in 1979 and has since developed a range of PC add-on memory boards and processor upgrade devices. The company's newest product is the Hyperam MC 32/16 which adds from 512K to 32Mb of memory to Micro Channel Architecture machines; it is 16- and 32-bit compatible.

Exports to the UK began in 1988 and currently represent about one-third of total sales; UK sales are expected to exceed local sales in 1992. □

Why a PC?

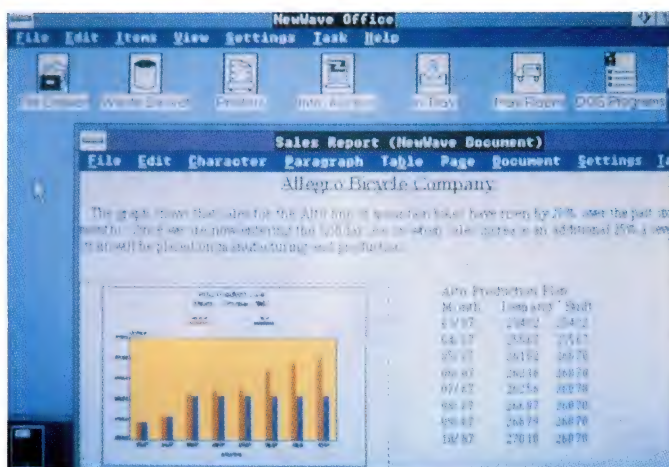
MILLIONS OF PCs have been sold in the UK over the past seven years, but what do users do with them? Smith-Corona, the office automation company, conducted a survey to find out. The company says the results compare closely with a similar survey published in the US earlier this year.

'It provided us with valuable insight into the habits of PC users and illustrates that the needs of most of these users can be met by a personal wordprocessor equipped with our Coronacalc spreadsheet software,' said Trevor Brooks, Smith-Corona's managing director.

Armed with the survey, Brooks noted that 74 per cent of PC users

would be satisfied with that setup and commented that 'Most users find the extra features and power of PCs both unnecessary and intimidating. Specifically, the survey showed 30 per cent of PC owners use their machines at least 50 per cent of the time for wordprocessing, while 23 per cent use their PCs exclusively for wordprocessing and 74 per cent use them mainly for wordprocessing and spreadsheets. □

Excellent Software!



The US Software Publisher's Association has awarded YC's 1990 Software Product of the Year, Hewlett-Packard's NewWave, honors as the Best Business Application: Graphic or Display Orientation, and Best Design Achievement. SimCity, The City Simulator (Maxis), topped the award winners, winning three awards as Best Simulation Program, Best Entertainment Program and Best Curricular Program.

THE US Software Publisher's Association (SPA) whittled 370 nominated products down to 126, of which 24 received awards for excellence. SimCity, The City Simulator (Maxis), topped the award winners, winning three awards in the following categories: Best Simulation Program, Best Entertainment Program and Best Curricular Program.

Other products which won awards in two or more categories include Hewlett-Packard's NewWave which won honors in the Best Business Application: Graphic or Display Orientation and Best Design Achievement; NewWave was also YC's Software Product of the Year for 1990. Compton's MultiMedia Encyclopedia (Britannica Software) won awards in the Best School Productivity/Creativity Program and Best New Use of a Computer categories. Eye relief Large Type Word-processor (MS-Dos) (SkiSoft Publishing) captured awards in the Best Business Application: Word or Text Orientation and Best Special Needs Program categories.

Companies that won awards in two or more categories include Lotus Development for Lotus Notes, which captured the Best New Business Software Product category and Lotus Magellan, which won for Best Utility/Communications Product. Broderbund Software won awards for The Playroom which topped the Best Early Education Program and Where In Time Is Carmen Sandiego? which won for Best Home Learning Program.

The prestigious Lifetime Achievement Award to honor an individual's contribution to the growth of the software industry was

Sydney launch for Silicon Graphics



At the world launch of Silicon Graphics' Iris Powervision family of graphics supercomputers and 4D/300 project supercomputers in Sydney, Graham Frost, managing director of the company's Australian operation, noted the new machines, with 86 graphics processors, were 10 times faster than the company's old GTX range.

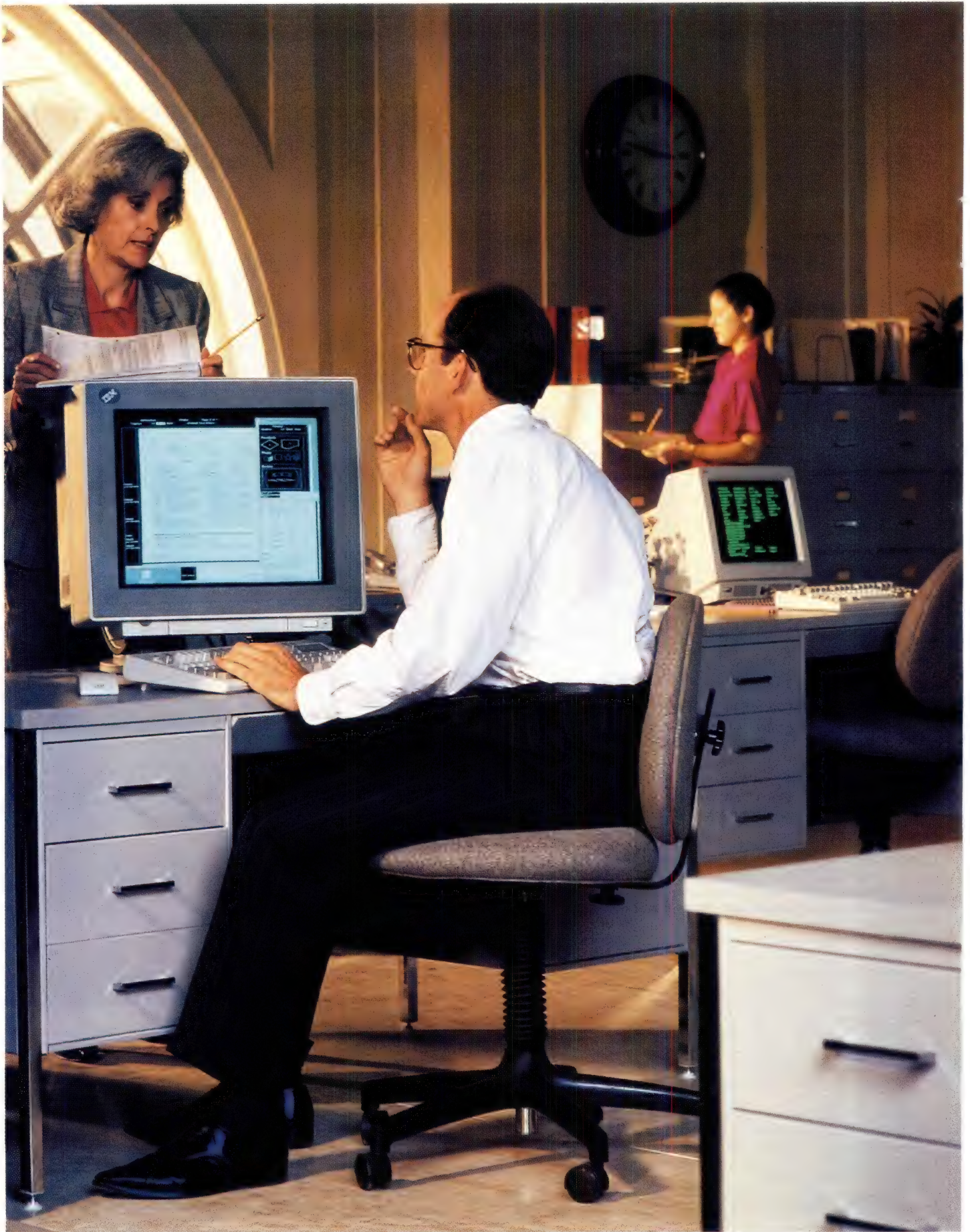
SILICON GRAPHICS chose Sydney for the world launch of its Iris Powervision family of graphics supercomputers and 4D/300 project supercomputers. According to the company, there have been three main stages in computing: the data processing phase, led by IBM; wordprocessing, dominated by Apple Computer; and visual processing in which it has led the way since 1983. The products unveiled last week seem to further strengthen Silicon's grip on this stage of development; the company claims it has a two-year lead on its nearest competitor – although IBM is making similar claims for its System/6000 (see page 35).

'While other computer vendors are laboring to produce systems that are competitive with our existing product line, Powervision is redefining the ground rules,' Silicon Graphics' Australian managing director, Graham Frost said and added that the Powervision family was 10 times faster than Silicon's old GTX range of graphics computers and offered a range of new features made possible by 86 custom graphic processors. Frost also noted that Silicon Graphics computer systems had widespread application in mining and other heavy industries in Australia. 'Airlines use the systems for training pilots, and 75 per cent of universities have them,' he said.

Prices for Powervision Systems begin at \$170,820 for an Iris 4D/210VGX and upgrades cost \$72,000 for installed Iris 4D/2xx-GTX systems. The first shipments are scheduled for June. □

balloted a tie by SPA members between Apple Fellow Alan Kay and NeXT president Steve Jobs. In addition, the SPA announced the winners of the Journalism Recognition Program for outstanding journalistic contributions to the PC software industry. This year's recipients include Michael Miller (*InfoWorld*) and Keith Ferrell (*Compute!*) for Best Software Reviewer, Larry Magid (*L.A. Times*) for Best News Reporting and Stewart Alsop (*PC Letter*) for Best Industry Analysis/Editorial. □

Industry Updates is provided by Newsbytes, the world's largest network of independent computer journalists.



UNIX

THE STATE OF PLAY FOR THE MASSES

Unix has emerged from the academic environment to make a major impact on business. Stewart Fist reports.

YOU MUST, by now, regard Unix as a generic term for a range of operating systems which all evolved from Ken Thompson's and Dennis Ritchie's work at Bell Laboratories in the early 1970s. Collectively, Unix is now the number three operating system in the world – behind MS-Dos and the Macintosh O/S, but ahead of OS/2.

However, for multitasking and multi-user systems, Unix is well ahead of all others, and it now runs on a range of platforms. You can use Unix on microcomputers, workstations, minis, mainframes and super computers, and the brand name on the box doesn't matter all that much.

During the last few years, Unix has migrated from universities and research institutions into the business environment and government circles. Its impact, until now, has mainly been in the large system, scientific and technical areas.

Its main rival, Pick, is easier to use and has been very successful (particularly in Australia) for relational database applications. Pick has proved to be flexible and supports a wide range of applications, but recently, it has become 'seamlessly integrated' with Unix which underscores the drift – this takes Unix to a dominant position in large- and medium-scale computing.

Despite this drift and the apparent need for standards conformity, all has not been harmony and light in the Unix world.

There are now two major variants of the operating system, and a lot of hostility between the two rival factions. Fortunately, of late, we have seen them coming together and presenting some sort of united face to the long-suffering consumer world.

Let's try to clarify the situation – the organisations and the standards. This is in a rough sequential order for the development of these alternative standards and the formation of the rival organisations.

Unix (AT&T)

The current AT&T version is called Unix System V, Release 4, but about 80 per cent of the world Unix market (cumulative) is shared between AT&T's Version 3, the Berkeley variations (BSD), Sun OS and Xenix.

Despite these variants, the major perceived value of Unix is its supposed portability which is largely due to it being written in the C language.

The BSD (Berkeley System Distribution) are the Berkeley Extensions to the original AT&T Unix which provides a rich set of networking and other utilities. The Berkeley group also changed the kernel to improve filename conventions and networking. There are some differences between BSD and System V, but most implementations are able to handle these discrepancies.

A number of major universities in the US contributed to the development of BSD, but the name comes from the Berke-



IBM AUSTRALIA

During the last few years, Unix has migrated from universities and research institutions into the business environment and government circles.

ley campus of the University of California.

IBM's proprietary Unix is known as AIX. Big Blue actively fought against Unix for many years, trying to get their own operating systems and environments in place to dominate world standards, but lately they appear to have decided to float with the tide. A large part of the Unix System V kernel was re-written to produce AIX, and thus avoided copyright problems, however, the major change from the user's point of view is in the security provisions. (For the enhancements in AIX 3.0, see 'IBM's System/6000' in this issue.)

IBM was instrumental in forming the Open Software Foundation, and successful in promoting AIX as the basis for the future OSF 1 operating system.

Microsoft produced Xenix as an 'enhanced' (read 'stripped down') version for microcomputers. It has been very successful and became the de facto standard for PCs, although it needs at least a '286-based AT.

Xenix has many special features for PC-type hardware and integration with MS-Dos (copy utilities, and so on). However, Xenix does not conform to the Common Object File Format (COFF) of Unix System V, which creates some problems. Lately, we have seen the emergence of Unix System V/386 which is a hybrid product that's able to execute files in either format.

The AT&T sponsored group (including Sun, NCR, Unisys, Motorola and about 40 other vendors) has been trying to standardise and promote Unix System V and the Open Look interface in opposition to the Open Systems Foundation's OSF 1 and Motif. Unix International have produced a kernel called SVID and they are attempting to unite Unix under a binary standard known as the Applications Binary Interface (ABI).

System V Interface Definition is the device-interface standard of Unix International that defines how device drivers, system calls, terminals and printer drivers

UNIX ORIGINATED on minicomputers some 22 years ago – there were no personal computers then. Computer hardware was expensive, and tended to be shared among many simultaneous users. Nowadays, with '386- and 68030-based PCs providing a single user with more power than 10 or more shared a few years ago, it's interesting to look at how the same technology has advanced the state of the art in minis.

McDonnell Douglas, a big player in the aerospace arena, has recently entered the large-scale Unix market with their Series X range of computers. Series X is a fully symmetric, parallel multiprocessor, shared memory system, and comes with a parallelised version of the Unix operating system.

Multiprocessor systems are an obvious way around the speed problems encountered when a large number of users are supported by a single system. As the system load approaches the limits of a single processor, extra processors may be added (if the system architecture permits) to off-load some of the work from the existing processor.

The problem with most multiprocessor systems is that, although they share a common block of memory, one processor (the master) is charged with maintaining I/O for the entire system. The law of diminishing returns starts to come into play on such systems after about five processors, due to the I/O dependence of the system on a single processor.

A fully symmetric design, however, allows any processor to perform I/O opera-

should be written. It establishes the basic Unix features (according to AT&T) with which compatibility must be maintained, but it omits machine-specific and management utilities.

The Applications Binary Interface standard of Unix International allows instant software portability within any processor architecture – including the SPARC designs and those using the Motorola 68000 family.

The graphic user interface, Open Look, is supported by Unix International in opposition to OSF/Motif.

Open Software Foundation

THE FOUNDATION was formed by a group of companies led by IBM, DEC, Apollo and Hewlett-Packard, to design an alternative form of Unix to the AT&T standard. They were perhaps over-reacting to a decision by AT&T and Sun to use the SPARC chip as

Series X



At the launch of McDonnell Douglas' Series X range of minis, the company also announced a new service that allows potential customers to evaluate the computer's performance by simulating the intended workload. Managing director Warren Grace said, 'We decided to offer this service in Australia as a way of boosting customer confidence and differentiating McDonnell Douglas as a solution provider from other vendors.'

tions, thus sharing the total burden among all the processors. This type of architecture is said to be fully scaleable, as

the performance of the system increases linearly with the addition of processors, right up to the physical limits of the system.

The Series X is based on the Multimax 520 hardware from Encore Computer Corporation of Fort Lauderdale, Florida. This system has multiple National NS32532 32-bit processors, running at a clock speed of 30MHz, with up to 10 dual processor cards per system – 20 processors in total! Each processor has a 256K cache (in addition to the internal 1K data and 5K instruction caches in the CPU itself), a 64-bit precision floating point processor, and inbuilt demand-paged virtual memory management. This adds up to between 17 and 170 VAX MIPS of performance, depending upon the number of processors installed.

All processors share a common memory space, which comes on 16Mb cards, with up to 10 cards per system. Data integrity is assured with the ability to detect 2-bit errors, and correct single-bit errors, which are corrected (scrubbed) during the refresh cycle. In addition, all bus signals are parity checked, with automatic re-try if an error is detected.

Special parallelised Unix implementations are available, either AT&T System V or Berkley BSD. Potential bottlenecks, such as I/O drivers, have been thoroughly researched, and steps taken to eliminate them through parallelising those sections of the code.

For more information, call McDonnell Douglas Information Systems, on (02) 436 5700.



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Traffic Signal Design Officer, Brett Herron, uses a Compaq Deskpro 386/20e running Unix to monitor the status of traffic intersections around Brisbane.

a binary standard, and to merge Berkeley and System V, without consulting other leading players in the Unix field.

OSF is a software research and development organisation. Its interface is called Motif and is based on IBM's AIX. The organisation has re-written the Unix source-code to completely free themselves from dependence on AT&T (and thus avoided copyright problems) while conforming to the new international Posix standard.

This new Unix, called OSF 1, has been delayed considerably, and its user-interface is called OSF/Motif, which is in direct conflict with AT&T's Unix interface called Open Look.

OSF 1 incorporates elements from Berkeley's Version 4.3, Carnegie Mellon's Mach 2.5 (the kernel), IBM's AIX (commands and libraries), and items from a few other sources.

Motif is an interface standard which combines a graphical user toolkit, windows manager, style guide and user-interface language. It's based on X Windows, and resembles Microsoft's Presentation Manager.

X/Open is a Unix software-standards organisation (originally of European vendors only) which doesn't develop standards. It adopts those devised by other organisations, publishes guidelines, and sets specifications and conformance-testing procedures. It also aims to ensure that

applications are portable among the various systems.

Membership has now extended from Europe to include most important American firms, and both OSF and Unix International companies are now members of X/Open. Today, it has become the main unifying force in Unix.

The organisation has adopted Posix as its Unix standard, and has defined the Common Applications Environment (CAE).

Portable Operating System for computer environments is being promoted as the IEEE 1003.1 and ISO IS 99451 standards. Posix has been adopted by the US government for equipment tenders, and by most hardware vendors in both the OSF and Unix International camps.

It incorporates elements of both System V and BSD, however, none of the current Unix implementations will be totally compatible with Posix without modification as it defines a new way of handling terminal I/O, and a new approach to file locking.

X/Open System V Specification is the alternative specification to Unix International's SVID which was put up by the X/Open group. It describes system calls, library routines, commands and utilities. It's very close to SVID, but with special emphasis on portability – mainly through the inclusion of database handler, SQL, and an indexed sequential file

access.

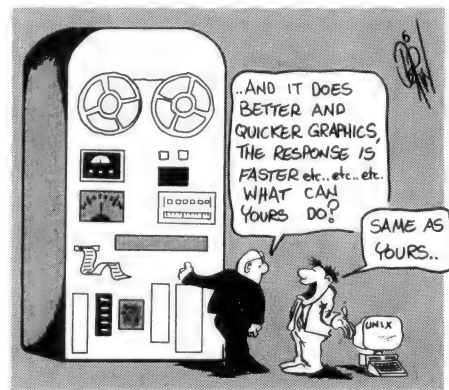
Mach is a Unix-like operating system developed at the Carnegie-Mellon University from the Berkeley 4.3 extensions to System V. It's used in the NeXT machine and will probably be integrated into AIX. And, FIPS number 151 is the US government's Federal Information Processing Standard.

But despite the confusion of standards apparent above, Unix has gained wide acceptance because it is reasonably portable, can run on a large range of different hardware platforms, and is scalable. Computer size isn't very important to Unix as it can run on hardware architectures from mainframes down to personal computers – provided they have a few megabytes of memory. Overall, you would have to say that Unix still offers the industry's best bet to deliver true applications portability.

From the programmer's point of view, Unix is relatively easy to handle. It has a rich software development environment that makes the job easier, quicker and cheaper. The portability factor is also attractive to software developers because it lessens their dependency on a single vendor and widens their potential market.

The Berkeley extensions have proved to be especially important because they allow Unix' powerful multitasking capabilities to be networked effectively. Users can run multiple, distributed applications across their network and, with the growing use of LANs, to integrate personal computers with central mainframes.

Desktop Unix computing is a fast growing area with the current world market value of \$7 billion set to double by 1993, according to market analysts IDC. IDC figures show that the Australian Unix market has been rising from \$92.8 million in 1986, to \$161.8 million in 1987, and \$267.5 million in 1989. The ANZ Bank, for example, has recently committed itself to Unix for its mid-range and low-end systems (out-



side the main-stream banking applications).

In the wider market, IBM and DEC have both recently revamped their Unix development and marketing programs, and vendors such as Wang, Prime and Data General, have all recently modified their proprietary Unix standards to begin bringing them in line with Posix and other X/Open standards.

The renewed popularity of the system has also delivered price reductions as more competition comes to bear on the major hardware and software vendors. There are industry claims of between 30 and 40 per cent improvements in price/performance ratios recently, which are well above the 25 per cent figure claimed for the industry as a whole. Competition is also being fueled by the US government's purchasing policy where 70 per cent of all new tenders specify Unix as a mandatory requirement.

There is no doubt that OS/2 Extended Edition with LAN Manager is now beginning to make inroads into this developing Unix market and, in fact, the two systems are obviously destined to compete head-on for this high-end database server market in the future. However, Unix is a much more stable and developed platform than OS/2 and it isn't tied to Intel which could prove to be an important factor.

Open system environments invite fierce competition and create volatile markets, often with little differentiation between competing vendor products. However, it is clear that a lot of innovation is being in-

Closer to standards

UNIX INTERNATIONAL, the Open Software Foundation (OSF) and AT&T's Unix Software Operation have concluded almost six months of formal discussions centering around expanding technical collaboration and modifications to organisations structures. As reported by Newsbytes, a number of issues have been resolved providing for increased collaboration between the three parties. Areas in which technical progress has been made include: agreement to a number of standards such as Posix 1003.1, XPG3, ANSI X3J11 C and X11, agreement to support the X/Open process, agreement to collaborate on common verification technologies to ensure compatibility and agreement to discuss emerging technologies such as multi-processing and internationalisation as appropriate.

It was also agreed that it would not be practical at this time for Unix International and the Open Software Foundation to effect a full organisational merger.

Concurrent with the announcement of the successful conclusion to the talks, Nixdorf Computer AG, a founding OSF sponsor, emphasised its continued sup-

port for OSF. Nixdorf is currently porting OSF/1, the OSF's operating system, to its Targon family of Unix-based products. By 1991, Nixdorf's Targon systems will be fully OSF/1 application compatible. The company said in a published statement that it believes MACH-based OSF/1 will become the most competitive Unix-based operating system of the 1990s.

Also announcing support of OSF is Hewlett-Packard. The company has announced plans to adopt OSF software and to become one of the first companies to ship the OSF/1 operating system. According to Dean Morton, HP executive vice president, HP plans to ship OSF/1 products in 1991 even though the OSF/1 operating system will not be released until later this year. He indicated that HP would move its Unix-based business to OSF in a staged manner.

Morton explained that OSF's operating system strategy for the kernel (the software at the core of OSF/1) will allow OSF/1 to provide a more powerful and more flexible open computing environment than AT&T's proprietary Unix kernel.

troduced into these markets in an effort to create differentiated product lines. Hewlett-Packard, for instance, are already offering a LAN Manager implementation across their Unix range, and Apple's Macintosh A/UX is the definitive example of Apple's ability to simplify a complex interface system for general use - it looks and acts like a conventional Macintosh.

A/UX 2.0

THE MACINTOSH has become famous for its Mac operating system, and in particular, for the graphics interface which (to stick my neck out) has set the standard for all personal computing in the next decade.

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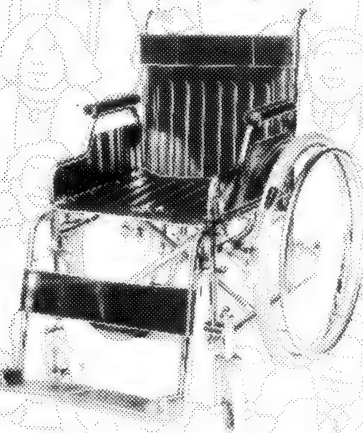
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UNIX

Unix tutorial

```
#include <stdio.h>
main () {
    int i;
    i = 1;
    while (i <= 3) {
        printf ("hello\n");
        i++;
    }
}
```

The body of the while-loop is enclosed in the braces, { and }. (If you have only one statement within the while-loop you may omit the braces.)

```
hello
hello
hello
```

THE UNIX operating system has a reputation for being hard to learn and almost enigmatic in its commands – it's neither of those, but it is *different*, particularly to users who are protected from the operating system by shells and file and applications managers. In a full-featured Unix system there is little reason for most users to face the \$-prompt, just as in many Dos systems there is little reason for users to work on the command line.

If you are thinking of going Unix, or would like to view it as an option for the future, or are merely curious about it, learning about it can be a chore: reading on its own is hardly satisfactory, seminars are time-consuming and generally expensive and going back to uni is a bit extreme. Fortunately, Peter Chan of Sydney-based K&A Software has addressed the problem: he's written a Unix Tutorial.

Supplied on three disks, the 42-lesson tutorial is self-paced and gives a through grounding in the operating system and its commands. Chan has made few assumptions about the user's knowledge, although a passing acquaintance with computers is essential. There are six modules to the tutorial: the first runs through a sample Unix session from login to exit; the second covers the file system; the third, Unix's editor, VI (for

'visual' – who said the commands are 'engimatic?'); the fourth, electronic mail; the fifth, miscellaneous commands such as lp (for 'line print'), sort, ps (for 'process status'), and the infamous 'grep' and 'cat'. The sixth is a short, but thorough, introduction to the C language (in which Unix is written).

Each session has a number of quizzes on the current topic. Unlike many tutorials, the quizzes and accompanying text are refreshingly *not* condescending and allow learners to keep some semblance of pride.

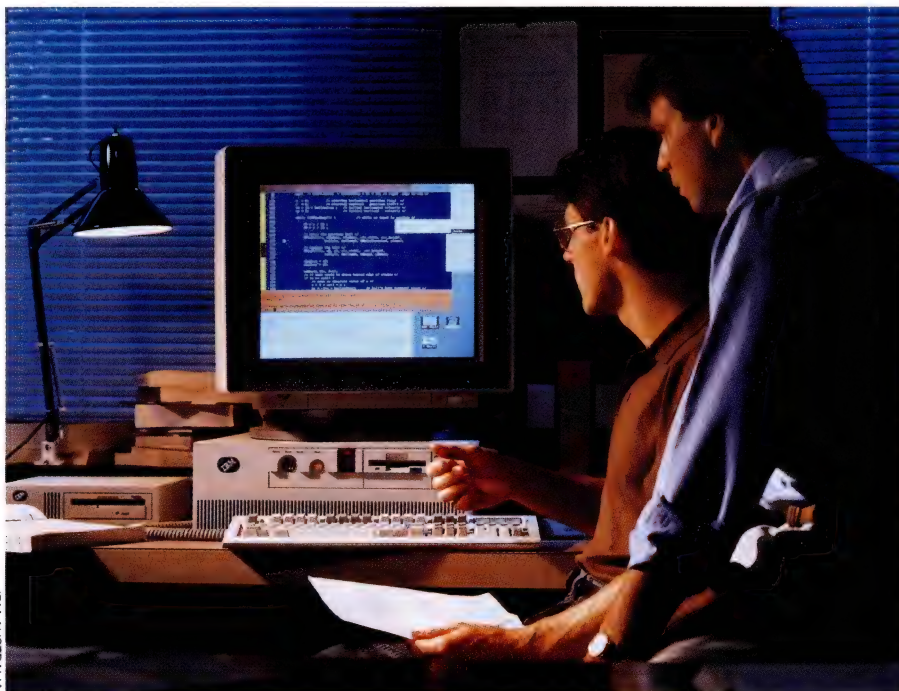
Chan wrote his Unix Tutorial after attending a seminar on Unix several years ago and coming away from it feeling unsatisfied. Using Turbo C, he wrote a C interpreter and editor initially, which gave him a flexible base for the tutorial; all up, it took about twelve months to be ready to market. Currently he is working on a C tutorial, with a Unix system administration in the planning stage.

When Chan has 'about two years' free, he would like to write a tutorial based on Dale Carnegie's book *The Power of Positive Thinking*.

Unix Tutorial is distributed by Micro Management Services, 15 Woolrych Cres, Davidson 2085 NSW; (02) 452 5966. It's priced at \$165.

possible. Apple has just won the prolonged legal battle over who has copyright over the interface, and the Federal District Court judge announced that Xerox' \$US150 million claims of infringement were 'largely without merit'.

Like most other technical journalists, I should apologise to Apple for sniping at them over their 'look-and-feel' actions. Obviously, the Federal District Court gives them more credit for the interface design than we journalists have. We've been



IBM AUSTRALIA

Unix is proving increasingly popular with software developers because it is reasonably portable, can run on a large range of different hardware platforms, and is scalable.

praising Xerox more than Apple – but the court says otherwise.

Thus, the idea that Apple would abandon its 'unique selling proposition' by bringing out steam-driven Unix for its machine seemed rather strange when A/UX 1.0 first appeared in April 1987. A/UX 1.0 had virtually no support for the Mac user-interface, no color, a limited number of applications, and no support for AppleTalk printing without a third-party co-processor card.

The first version we saw in Australia was the upgraded A/UX 1.1 which would run many more Mac applications, had full color support, and an integrated Macintosh-Unix file exchange utility. It was an immediate success despite the fact that Apple didn't actively market or promote the product. They were obviously waiting for the upgrade – and who can blame them as it might be the right product, but was it the right image?

Tony Williams of MacWorld, who plays with Unix in his leisure time and has a passion for the Mac which borders on the obscene, makes a not-too-cryptic distinction that 'A/UX 1.1 was a superb standard Unix, but the new Version 2.0 is a now a superb Macintosh Unix'.

The difference, of course, is in the interface. A/UX 2.0 presents icon-based

screens to the world that followed all major Mac interface standards. It can launch multiple Mac applications within a System 6.0 MultiFinder environment and run them concurrently with Unix and X-Windows applications. MultiFinder supplies the interface for A/UX 2.0.

If you want to be technical, 2.0 is now a full implementation of AT&T's Unix System V, Release 2, Version 2 with the Berkeley 4.3 extensions. And, it is compliant with IEEE's Posix 1003.1 (1988) specification, SVID (Unix International's System V System Definition) and SVVS (System V Verification Suite) ... and, also with FIPS number 151. To put it pretty simply, it is as standard a Unix as you can get.

Apple say that it can run any Mac application (under MultiFinder) that adheres to the Inside Macintosh specs (with the 32-bit Quickdraw), and it will also run, as you might expect, AT&T Unix and BSD Unix applications without modification. With an add-on package you can also use MIT's X-Window System (Version II, Release 3 – which is highly portable and network transparent) applications and also some hybrid Unix programs that need the Mac Toolbox.

To get the system up and running you'll need at least the 68030-based Mac SE/30 (or the 68020-based Mac II with paged

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- 1505 BRANDONS LUNCHBOX 6 Educational games for kids 3 - 7.
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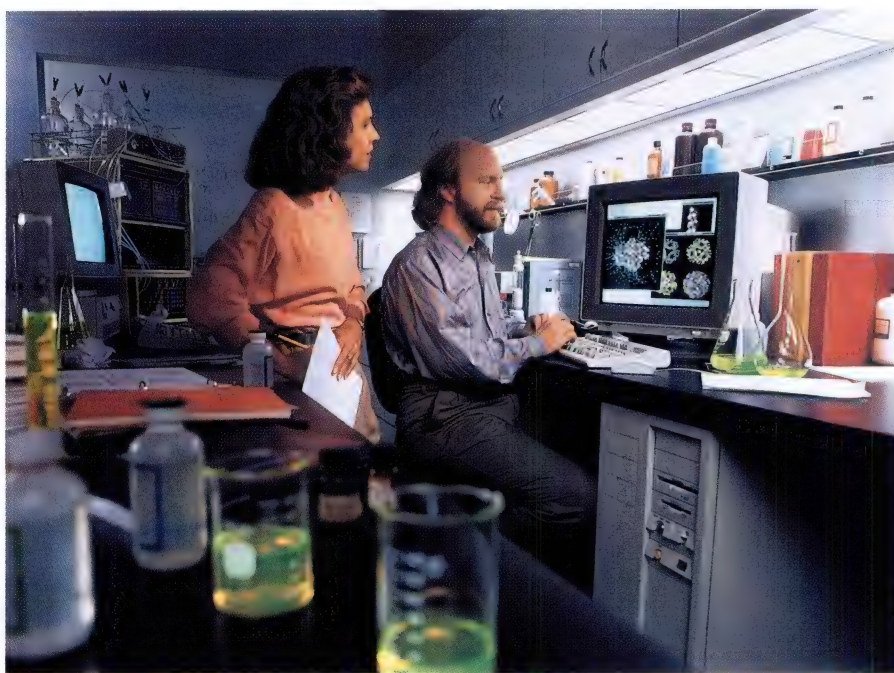
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Unix-running workstations have become the standard in computer-intensive university applications like molecular modeling.

memory management), 4Mb of RAM, and an 80Mb hard disk. The virtual memory option is also supported, so you aren't limited to the RAM memory for all running applications.

Mac-Unix

THE INTEGRATION of the Mac interface with Unix is so complete that you've got all the normal icon-and-mouse functions. You can launch any A/UX-modified Unix file by pointing and clicking; use a Mac mouse-driven editor for text files (you don't have to learn to use vi, the resident Unix editor that is as friendly as Dos' edlin); cut and paste between applications in all environments; and select printers and Apple file servers through Chooser in the normal Mac way.

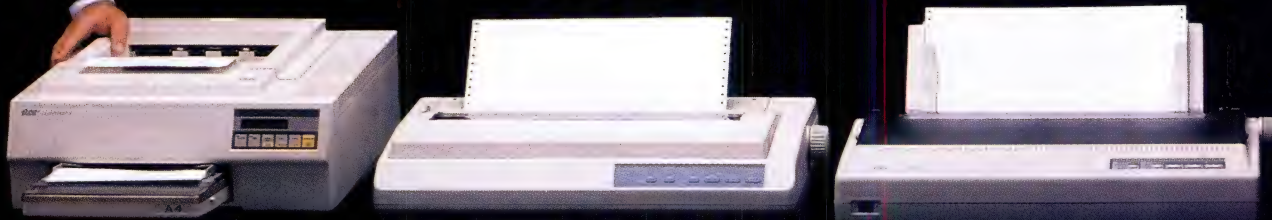
The X-Window System allows you to run X client applications with the Mac interface by using a customised version of MultiFinder called A/UX Finder. There are two distinct components here: Mac X allows X-Window System client applications to share the A/UX Finder desktop, while XII (for more experienced or technical users) provides a faster, native, but more

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basic, X-Window environment without the Mac interface.

With the XII option, the normal Mac functionality is lost, but you do gain is dramatic performance – especially on the slower Macs, however, most A/UX users will opt for the more flexible MacX approach. Both variations allows X client applications to run on either the local or a remote host computer on the network. And, in the remote host case, you can manipulate a complex, memory-hungry program at a distance while displaying only the output on your own Mac, if you wish. There's support here for monochrome and 8-bit color, and a range of display font families.

In communications, A/UX provides the standard Unix communications (such as cu and uucp) as well as TCP/IP and AppleTalk. You'll need an Apple EtherTalk NB card, or the equivalent, if you want to use Ethernet. On the system administration side, 2.0 keeps redundant copies of crucial files so a network can recover after a system crash, and Unix scripts are provided to help connect peripherals and modify user-information.



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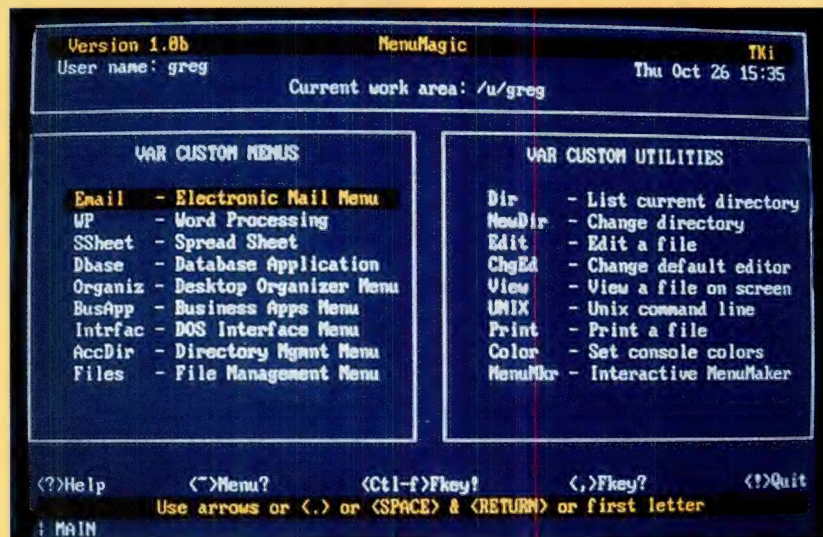
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UNIX

MenuMagic



'SYNTACTIC AND pedantic' are two adjectives frequently used about Unix commands. But Unix is a mature operating system with a sophisticated range of software in support. One of the most recent Unix releases is MenuMagic, a cursor-based set of Unix tools. Developed by well-known US-based Unix developer Terry Keene, it features Dos to Unix utilities, support for systems administration, workgroup tools and powerful configuration options.

According to Dr Peter Elliott, of Qunix, the local distributor of MenuMagic, it 'allows a tailor-made interface to be set up so users and system administrators never

need to see the dreaded Unix prompt. SCO utilities such as sysadmsh are neatly tied into a separate administrator's menu template and resellers can configure their own specific system to sit on top of existing software.'

The utilities menu provides features that *should* be part of a Unix system: a file reviewer and direct access to the spooler, for example. The package also has its own set of desktop accessories which includes an appointment calendar, a to-do list, calculator, phone book and note pad.

Qunix can be contacted on (07) 831 8666 or (08) 77 7616; MenuMagic is priced at \$450.

If you are involved in developing new Unix applications or porting old ones to the Mac, you've been provided with an assembler, a C compiler, debuggers, and the Source Code Control System (SCCS) with related tools. Version 2.0 also has a set of Unix libraries that allows C programs to access the Mac Toolbox. Third party developers will supply other languages and tools.

One of the nicest features, if you only use Unix occasionally, is the Commando Unix command builder. I can never remember the range of legal commands and parameters in Unix, so Apple have included a menu system which allows you to point-and-click to invoke the appropriate command. To bring up this menu you simply double-click on the utility icon, or select the feature from within a shell window.

Also provided are the traditional Unix shells (C, Bourne and Korn) that allows you to enter commands and receive output in the standard Unix way, although you are still within a traditional Mac-style window with scroll bars and menu selections.

There are many other supporting features I could bore you with: Mac TCP, HFC file access, sound capabilities, and so on, but these are of minor importance. The key facts are that A/UX 2.0 provides you with a very flexible, highly stable, very standard form of Unix with all the best of the Mac interface features.

Unix has never been known as a user-friendly environment, but now with A/UX it could well become available to a new range of more techno-phobic users, and this could be one of the more important developments for Unix in the future. □

MINIX UNIX FOR PCs

IN RECENT YEARS, PC owners wanting to learn about Unix have been limited to such as Microport Unix or SCO Xenix. Both require fairly large, powerful machines (and a large, powerful guru to help set up the system). And, with all due respect, they are fairly expensive operating systems – all up, the cost is out of the price range of most standalone PC users. So what opportunity is there to get into Unix without spending big bucks?

The answer is Minix – a small Unix-like operating system, originally developed as a tool for teaching operating systems concepts. Minix is also a highly usable operating system for PC owners with small budgets who wish to learn about and use the Unix operating system. It was developed by Dr Andrew Tanenbaum, Professor of Computer Science of Vrije Universiteit in the Netherlands, and is published by Prentice-Hall.

Minix?

FIRSTLY, MINIX IS not Unix, but it appears almost identical to the user and programmer. Secondly, it does not attempt to implement all the functions of Unix, but uses a 'Small is beautiful' philosophy which places ease of understanding ahead of full functionality. Minix consists of a textbook, *Operating Systems: Design and Implementation* – known as The Book – plus software on floppy disk. There are two versions of the software: one runs on IBM PC compatible machines, the other on Atari STs. The PC version (Minix-PC) will run on XT, AT, some PS/2, and '386 machines.

Being a Unix-like operating system, many of the Unix commands and utilities are provided. There is a C compiler, support for printer, modems and terminals, multitasking and multiuser, just like Unix. But best of all, *full* source code is supplied. Minix is an 'open system' in the sense that any user can peruse the source, make changes, create their own version, and share the changes with other users.

The Book is intended to be not only a reference manual for Minix, but also a textbook on operating systems theory. Thus, it combines theory and practice. For example, a discussion of several

Nick Andrew tells of
a workable Unix-clone
for the PC – it even
runs on XTs!

methods of process scheduling (the method by which a multitasking operating system selects which program to run next) is followed by a description of the way Minix implements process scheduling. Concepts integral to operating systems such as memory management and input/output are explained clearly, and in a style which makes the book readable and interesting, even for the novice.

The Book is over 700 pages long, but don't be put off by this – 360 pages are devoted to appendices, with an introduction to C and the IBM PC architecture, Minix Users Guide, Minix Implementers Guide, and Minix Source listing. The Minix Users Guide describes how to run Minix, how to be a Super-User, and the more important commands of Minix. This part of may be too brief for beginning Unix users, so an additional tutorial, such as 'The Unix System' by S.R. Bourne, may be helpful. The Minix Implementers Guide details how to recompile and relink Minix itself, after making changes to the code or applying updates. Again, this section may be too brief for beginners, but the brevity of explanation is matched by the joy experienced after having successfully rebuilt

```

proc -pid- -pc- -sp- flag user -sys- base limit recv  command
TTY      0 69DD 8342 0    0    3573 2K 658K
PRINTR   0 69DD 8446 8    0     0 2K 658K ANY
WINCHE   0 69DD 8554 8    0   1043 2K 658K ANY
FLOPPY   0 69DD 8654 8    0    109 2K 658K ANY
RAMDSK   0 69DD 8754 8    0    682 2K 658K ANY
CLOCK    0 69DD 885A 0    0     0 2K 658K
SYS      0 69DD 895A 8    0   2670 2K 658K ANY
IDLE     0 1DC 8160 0    0  507931 2K 658K
MM       0 248E 3822 8    0    578 44K 59K ANY
FS       0 48A9 5824 8    0   7424 59K 113K ANY
INIT     0 C2E FB0 8    0     4 113K 117K MM
3       17 56A6 4898 8   262   727 124K 165K FS /bin/sh
4       16 2C2 7CA 8    6    23 121K 124K MM /etc/update
5      310 133A 4B00 8    9     5 165K 189K MM capture

PROC  -----TEXT----- -----DATA----- -----STACK-----  BASE SIZE
MM    0 AE9 0 0 AE9 3C1 3C1 EAA 0 44K 15K
FS    0 EAA 0 0 EAA DA1 DA1 1C4B 0 59K 55K
INIT  0 1C4B 0 0 1C4B 108 108 1D53 0 113K 4K
3     0 1F0D 585 0 2492 1A4 492 2924 3B 124K 41K
4     0 1E5B 2D 0 1E88 5 7C 1F04 9 121K 3K
5     0 295F 140 0 2A9F 380 4AD 2F4C 12 165K 24K

```

Minix runs several tasks concurrently, each with its own program counter, text, data and stack segments. This status dump (obtained by typing F1, and then F2) shows which tasks are running, which are waiting for messages from other tasks, and the system memory map.


```
# rm /tmp/vn[0-4]*
# mount
/dev/hd1 is mounted on /usr
/dev/hd3 is mounted on /users
/dev/hd2 is mounted on /usr/spool
# df
/dev/hd1   i-nodes: 1141 used 2349 free      blocks: 9264 used 1182 free
/dev/hd3   i-nodes: 2112 used 4526 free      blocks: 17524 used 2366 free
/dev/hd2   i-nodes: 657 used 2836 free      blocks: 6493 used 3962 free
# set
f=/usr/spool/fido
d=/users/Gate/src/Minix
um=umount /dev/at0
m=mount /dev/at0 /fd
PS2=)
PS1=#
IFS=

PATH=/bin:/usr/bin:/usr/local/bin:/users/Zterm:
TERM=minix
SHELL=/bin/sh
HOME=/usr
LOGNAME=root
USER=root
#
-----
```

The Minix shell is very similar to the Unix Bourne shell (sh). Minix can work with file systems on either hard or floppy disk.

the entire system – which is not only possible, but encouraged!

The last 275 pages contain a cross-referenced listing of the entire kernel source code. (The kernel is the lowest level part of the operating system; it provides services to user programs. The MS-Dos equivalent of kernel would be IBMBIO.COM and the BIOS.) The code is well commented, every function is explained, and the implementation chapters discuss each block of code in relation to the operation of the whole system.

Internals

MINIX WAS DESIGNED to be understood by mere mortals (rather than Unix gurus). As a result, the kernel is divided into three sections, each of which can be looked at and understood separately. These three parts are the low level control for process handling and device drivers, the memory manager (MM), and file system (FS). These tasks (as they are known to the system) communicate by

sending messages to each other. Without this message-based concept, the code would be a lot harder to comprehend, and there would be more bugs. Unix is *not* message-based, and this is the major difference between Unix and Minix. The Minix code is written in C, so the code for the PC and Atari ST versions is very similar, except for a few low level (hardware specific) routines.

Minix is not only a system for professional types to study, or for pre-burnout computer whiz kids. A person wishing to learn about Unix can have a system on their desk which will be indistinguishable to them from Unix, without knowing anything at all about recompiling the system. Someone interested in C programming can examine and modify the source code of the commands – these are real working programs, not trivial examples or (at the other extreme), massive programs of undocumented, poorly commented code.

And, for anybody who wishes to dig deep into Minix, find out exactly what

makes it tick, create and test their own version, Minix caters for this, too. So Minix serves a variety of needs. The common requirement is a desire to learn something new and to experiment. It is not a system (like, say OS/2) where one asks the question 'What applications does it run? Does it run WordPerfect (say)?' Minix is a system where the user does their own thing.

Experiments

SOME AUSTRALIANS have been 'doing their own thing' with Minix. In fact, they have made a considerable impact upon the future of Minix. Foremost of these, Bruce Evans, has made many improvements to the system, and created a version of Minix-PC which runs in 80286 protected mode. (Ordinary Minix, like Dos, runs in 8088 'real mode'. Protected mode gives speed improvements, memory protection, and access to a potential 16Mb of memory.) Evans' 80286 version forms the basis for the latest version of Minix-PC, now being gamma-tested by some thousands of users worldwide. He says an 80386 version isn't far off. He has also completed a port of Gcc, the Gnu C Compiler, a product of the Free Software Foundation.

Colin McCormack has ported Minix to the Applix 1616, an Australian-designed and -built micro, based on the 68000 processor. In late 1990, Prentice-Hall will be releasing Minix 1.5, the most recent version. It will run on the PC, XT, AT, PS/2, '386, Atari ST, Commodore Amiga, and Macintosh. In addition to running on new machines, it will support protected mode on the '286 and '386, have over 175 utility programs standard (and over 225 library routines), support up to 3 users via RS232 ports, allow distributed computing over an Ethernet, contain a spelling checker with a 40,000 word English dictionary, and many other new features. The PC distribution has so much software that 1.5 will require 17 diskettes, and as the contents of the disks are compressed, that is the equivalent of about 30 diskettes.

Minix is being used by several Australian universities, both as a teaching aid in an operating systems course, and as a base for experimental work. For example, The University of Adelaide Computer Science department uses Minix in their Level 3 Operating Systems course. Students learn theory with reference to Minix, and are expected to make a modification to the system as part of the

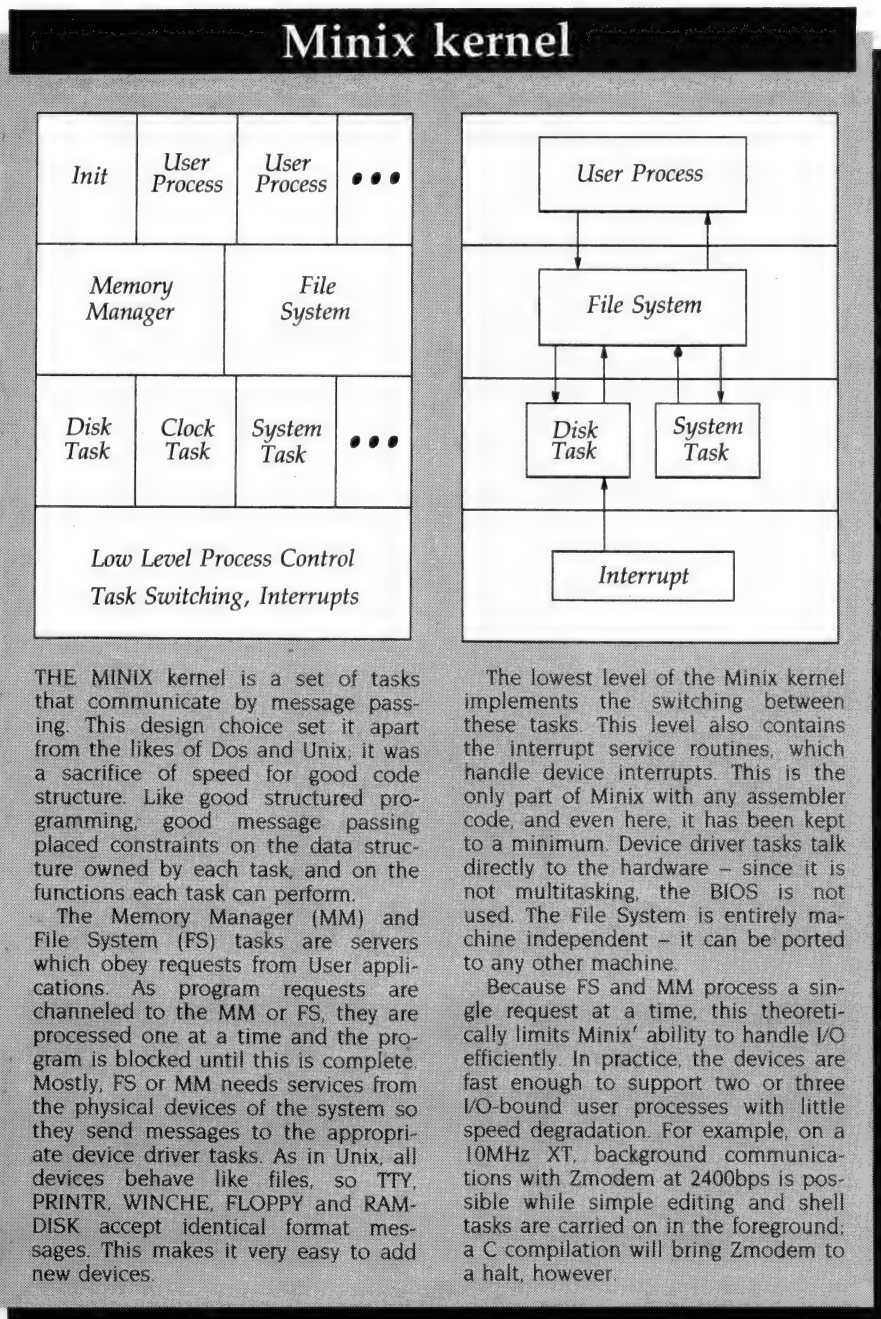
coursework. Other universities use Minix purely for research, without basing any formal education on it. An honours student at Adelaide University is currently working on getting Minix running on a multiprocessor system based around the NS16032 cpu.

Applications

I MENTIONED earlier that Minix is not the sort of operating system where one asks 'What applications does it run?' I didn't mean that anything not supplied with Minix must be written by the user. In fact, many Unix-based programs have already been rewritten by dedicated users. These rewrites, often intended to fill some need on another operating system, have been ported to Minix. Additionally, many Unix-based programs appearing on the worldwide Usenet network may be compiled under Minix with a minimum of difficulty. These are mostly the smaller programs; in PC terms, Minix works in the small (16-bit) or compact memory models, allowing a maximum of 64K address space and 64K data space.

Bruce Evans is working on a compiler and version of Minix which will remove these restrictions. This is a true 32-bit, 80386-based C compiler; it is currently being beta-tested by several Australian Minix users. The Unix programs which have been ported to Minix and are available free from Minix archive sites (more on that later) include Elle (an Editor Looking Like Emacs), the Elvis editor (a VI workalike for the vi addicts), Zmodem file transfer program, Patch (a utility for applying upgrades to files), Usenet News software, electronic mail, and others.

Technically speaking, Minix has its shortcomings. It is not very fast at multitasking. It does not support large memory models (PC Minix only), and does not run on some less-than 100 per cent PC-compatible boxes. The main point of incompatibility is the hard disk controller. As Minix does not go through the BIOS, its Winchester device driver cannot cope with some hard disk controllers. Minix is not 100 per cent Unix-compatible (System V or BSD). And – there is no technical support from the distributor. These are valid expectations of a commercial Unix system. Not so for Minix, being a teaching operating system which can be administered by even Unix neophytes, and for which experimentation and modification of code is encouraged.



THE MINIX kernel is a set of tasks that communicate by message passing. This design choice set it apart from the likes of Dos and Unix; it was a sacrifice of speed for good code structure. Like good structured programming, good message passing placed constraints on the data structure owned by each task, and on the functions each task can perform.

The Memory Manager (MM) and File System (FS) tasks are servers which obey requests from User applications. As program requests are channeled to the MM or FS, they are processed one at a time and the program is blocked until this is complete. Mostly, FS or MM needs services from the physical devices of the system so they send messages to the appropriate device driver tasks. As in Unix, all devices behave like files, so TTY, PRINTR, WINCHE, FLOPPY and RAM-DISK accept identical format messages. This makes it very easy to add new devices.

The lowest level of the Minix kernel implements the switching between these tasks. This level also contains the interrupt service routines, which handle device interrupts. This is the only part of Minix with any assembler code, and even here, it has been kept to a minimum. Device driver tasks talk directly to the hardware – since it is not multitasking, the BIOS is not used. The File System is entirely machine independent – it can be ported to any other machine.

Because FS and MM process a single request at a time, this theoretically limits Minix' ability to handle I/O efficiently. In practice, the devices are fast enough to support two or three I/O-bound user processes with little speed degradation. For example, on a 10MHz XT, background communications with Zmodem at 2400bps is possible while simple editing and shell tasks are carried on in the foreground, a C compilation will bring Zmodem to a halt, however.

Usenet

A DEDICATED group of Minix users is continuously improving and expanding the system. These people, hackers in the traditional (pre-media distortion) sense of the word, communicate through a worldwide network called Usenet. Their forum, called comp.os.minix, is where they write their questions, receive answers, enter or read bug reports, and where they distribute their new or changed programs to the other users of

the net. A recent survey estimated that comp.os.minix has 16,000 readers. This is a large skills base, and more than makes up for the lack of technical support from the distributor.

Minix is a very dynamic system, in the sense that there are frequent updates. Tanenbaum himself collects from the net many bug fixes, improvements and new programs, to be incorporated into the next version. Sometime later when a coherent set of updates has been created,


```

---wa ASS_1.GIF      49984  00:01 19 Jul 1989
---wa BECKIE1.GIF    57344  00:00  1 Jan 1980
---wa BECKIE3.GIF    56320  00:00  1 Jan 1980
---wa BECKIE4.GIF    58880  00:00  1 Jan 1980

# dosdir -l 0
Volume in drive D has no label.

Root directory:
---wa BINKSRC.ARC     371500  23:46 16 Mar 1989
---wa CONF_400.SRC    130282  13:44 27 Sep 1988
---wa DOSMODEM.ARC    4043    17:49  3 Jan 1987
---wa OCOM_530.ARC    46303   17:50 28 Aug 1988
---wa VIBM_110.ARC    4631    17:50 28 Aug 1988
---wa X00V110A.ARC    48837   10:27 22 Aug 1988
---wa ARC600.EXE      139904  23:55 24 Feb 1989
---wa ARCA129.ARC     12390    01:29  9 Dec 1987
---wa ARCE31C.ARC     11266   15:57  6 Feb 1988
---wa PAK10.EXE       71578   03:41 17 Nov 1988
---wa PK361.EXE      119680   00:00  2 Aug 1988
---wa SPAZ_120.ZOO    27819   21:48 20 Feb 1989
---wa Z00141.ARC      49792   02:27  2 Jan 1980
---wa Z00201.EXE      82560   21:24 20 Jan 1989
---w- LHARC.EXE       30470   16:03 20 Jan 1990

Free space: 58368 bytes.
#
-----

```

The DosRead, DosWrite and DosDir commands allow files to be transferred to and from MS-Dos diskettes and the hard disk drive C: partition. (Minix uses its own separate partition on the hard disk.)

POSIX

POSIX IS A project sponsored by the IEEE (Institute of Electrical and Electronic Engineers). Its intention is to create a set of standards to which a Unix system must comply if it is to be known as 'POSIX-conformant'. Software authors can write programs using the POSIX specifications which will run on all conforming Unix operating systems. As this includes nearly all the variants of today (such as BSD, System V and AIX), POSIX is a wide reaching standard. And, the US government has made it a requirement of the tendering process for Unix systems.

The POSIX standards include:

P1003.1 System Calls (finalised),

P1003.2 Shell and Utilities (draft),
 P1003.3 Verification (draft),
 P1003.4 Realtime extensions (draft),
 P1003.5 ADA language bindings (draft),
 P1003.6 Security (draft), and
 P1003.x Other topics.

Minix 2.0 intends to comply with P1003.1. A later version may comply with P1003.2. Obviously the reason behind POSIX compliance is not to make sales to Uncle Sam, but to improve Minix' compatibility and function. The POSIX documents can be obtained from: Publication Sales, IEEE Service Center, PO Box 1331, Piscataway NJ 08854-1331 USA.

sary, and the result is a brand new executable system. Any bugs they find are reported on the net, and Tanenbaum collects the fixes to become part of the next version.

To date, this cycle of upgrades has occurred seven times in the three years since Minix was first released. Prentice-Hall sells Minix upgrade kits for major versions, but it takes time to reproduce and distribute a new version of software, and frequent updates cut into a distributor's profit margins. Updating Minix via Usenet is essentially a free service, and net users are typically six to 12 months ahead of the rest.

At present, the version of Minix on sale is 1.3. Net users have been using 1.4 for some six to nine months. The most recent version, 1.5, has only been distributed in the past several months – this is a significant new release as it is based upon Evans' work with the 80286 protected mode system, and some nasty bugs were found. These bugs were fixed very quickly with a couple of minor upgrades, 1.5.3 and 1.5.5. Once the system seems stable, Tanenbaum will send version 1.5.x to Prentice-Hall for further distribution. You can expect to be able to buy this version in late 1990 or early 1991.

Having access to comp.os.minix on Usenet is therefore a big advantage to Minix owners. Though Usenet is typically oriented towards the university and research community, one can obtain access without being part of this community. A public access BBS in the Sydney area known as RUNX, (02) 487 2533, provides Usenet facilities. Also, a system known as ACSgate (ACSnet to Fidonet GATEway) allows comp.os.minix and several other Usenet forums to appear on some Fidonet BBSs around Australia. For further information ask your local Fidonet SysOp.

Future Minix

FUTURE VERSIONS of Minix will enhance its power considerably. Currently, Tanenbaum is working on version 2.0. The major improvements in that version will be an ANSI C standard compiler, and conformance to POSIX standard P1003.1 (System Calls). This will aid in porting programs written to POSIX standards to Minix. It shows that over time, Minix is becoming less of a 'toy' operating system (in comparison to the commercial Unix variants) and more 'real'. The process of improvement is

they are tested by a select group of Minix enthusiasts known as the Minix Beta Testers. After testing, the entire set of updates is sent through the net. Inter-

ested users download the updates and apply them to their own copies of Minix to upgrade to the latest version. They recompile and relink whatever is neces-

quicken by the many Usenet users who devote their time and skills towards improvements of their own design, and share these improvements, for no monetary gain.

For those interested in learning more about Minix, the next step is to buy The Book. It is *Operating Systems: Design and Implementation*. Its ISBN number is 0-13-637331-3 and it is available from Hotline Books in Sydney or Dymocks for \$41.95. This book is a worthwhile addition to your computer library even if you don't intend to run Minix.

The software itself may be obtained from Dymocks, Hotline Books, or direct from Prentice-Hall for \$341.00 for the PC version. The Atari ST version is not yet available in Australia (please contact Prentice-Hall, (02) 939 1333, for details.) Minix for the Appliance is available from Applix, Inc. of Sydney. The Minix license allows the owner to make two copies of the complete system to give to other users.

A Minix Information Sheet is available (not from Dymocks or Prentice-Hall) which gives details about some types of

ANDY TANENBAUM, developer of Minix, is also the author of several textbooks. His *Computer Networks* is widely recognised as a definitive piece of work. In this book, he combines the theoretical aspects of network design with an analysis of several communications protocols, based around the ISO OSI network reference model. *Structured Computer Organisation* describes how computers can be constructed as a hierarchy of layers, starting at the level of transistors, and working up through the digital logic level, microprogramming, assembly programming, and operating systems. Numerous advanced topics, such as RISC machines and multiprocessors,

are also covered.

Currently, Tanenbaum is working on Minix 2.0, and Amoeba, a distributed operating system. Amoeba is intended to take a system of dozens of machines (such as Sun workstations linked via Ethernet) and make them act like a single integrated system – this will be entirely invisible to the user. Unlike Minix, Amoeba is a serious commercial venture. The project is partially sponsored by the OSF (Open Software Foundation) who will be evaluating its potential for use in future OSF operating systems.

Special thanks go to Tanenbaum for reviewing this article prior to publication.

computers, hard disk controllers or video cards which can or cannot be used with Minix, as well as some other useful information. To obtain more information about upgrading Minix or gaining access to comp.os.minix, please send an self-

addressed and stamped envelope with your question to: Minix-Info, PO Box 177, Riverstone 2765 NSW. To obtain the latest Minix Information Sheet, please send an additional \$2 cheque or money order to the above address. □



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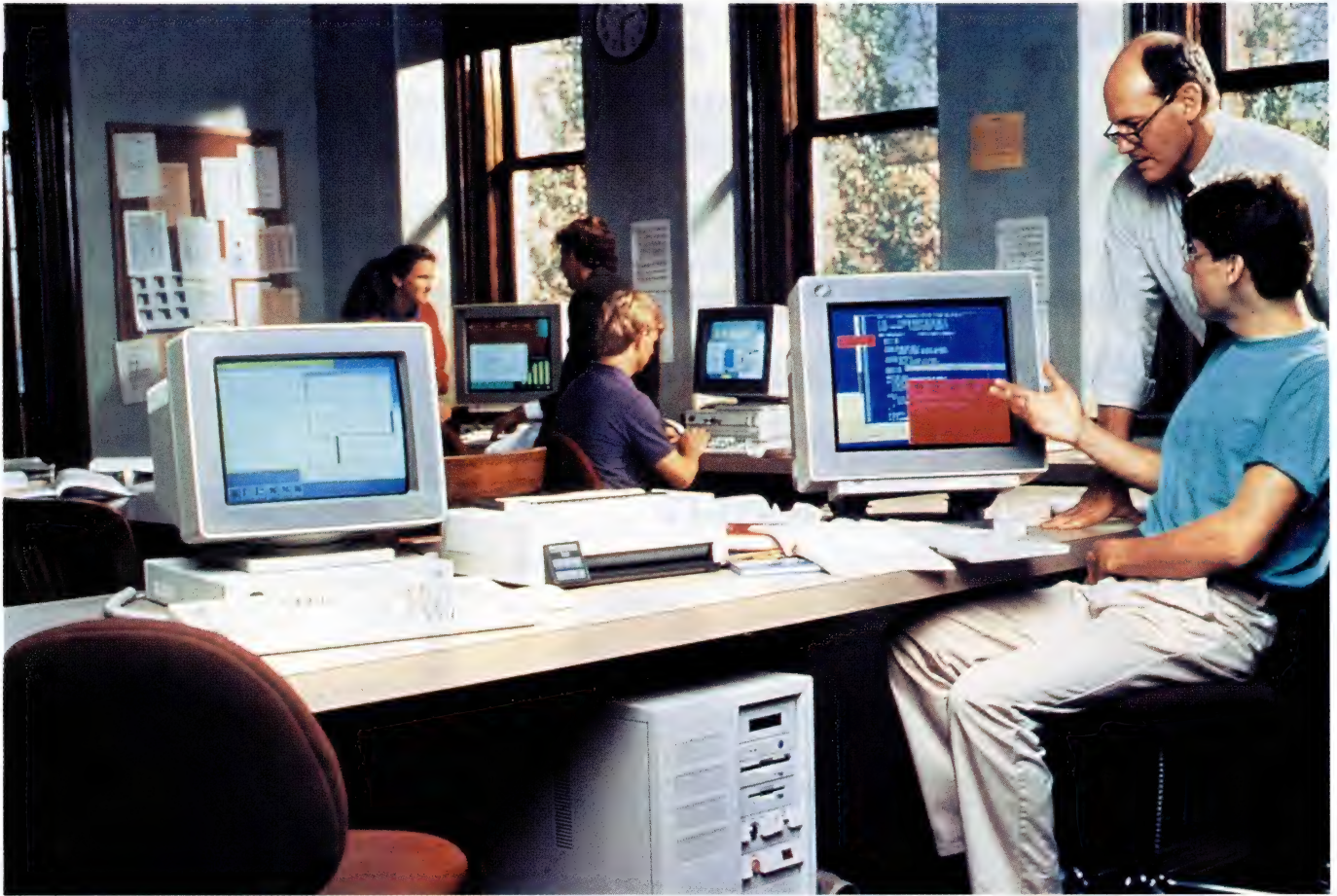
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IBM'S SYSTEM/6000

THE LAUNCH of IBM's Risc-based, AIX-running System/6000 POWERstations and POWERservers promoted some controversy inside the world's largest computer manufacturer. IBM staffers at the Rochester, New York, home of the AS/400 series of recently launched minis, see the System/6000 as direct competition to their own baby – which has been performing exceptionally well in a highly competitive and shrinking niche. There was also concern that the new line would take some of the sheen off the launch of a new and more powerful AS/400 family scheduled for about the same time.

In fact, the press reported, Rochester even argued against the name – they felt the model number should be less than 400. Their argument was that the new system would be promoted directly against their own, the 6000 model number gave a false impression of computing power, and the price was 'too aggressive'. Other company insiders – and

Will IBM's new power platform do for Unix, what the PC did for Dos?

the market itself – generally saw things differently. The market feeling was summed up by Motorola's product manager for the 88000 chip (used in systems that the 6000 takes head on): '[The 6000's] ability to support multiple instructions is biased in favor of double precision floating point performance at the expense of integer operations.' In other words, it's better at engineering applications than large commercial ones.

The only apparent area of conflict is where a powerful server is required to hook corporate divisions or government departments together. IBM recognises this and points to it as an indication of the company's new direction in marketing. Whatever that might mean, the com-

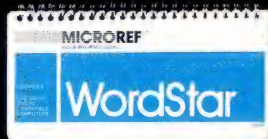
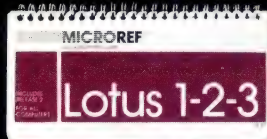
pany is the first to address every major computing market niche: from portables and diskless workstations, to standalone and networked PCs, to power graphic workstations, file servers and mainframes, the company now has the ground covered. However, it will be several years before that 'impacts fully'.

At the application level, the 400s and 6000s are very different machines, each with its own well-defined market niche. Say 'System/6000' and the response is 'graphics'; say 'AS/400' and you hear 'database'. On the whole, AS/400 sites will be bigger than System/6000 ones – the minis are finding homes in companies with several hundred or more employees, while the 6000s are being used in smaller sites that need a lot of computing power shared between a few users.

With the Power series, IBM is taking on the likes of Sun and Apollo (now owned by Hewlett-Packard) – they've had the very lucrative graphics workstation market (estimated at \$10 billion for

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1990) virtually to themselves and IBM has declared its intention to grab 20 per cent of it by 1992. And, industry analysts point out that the performance of the new range is, in some respects, a generation ahead of other current offerings. One of the few sour notes regarding the launch was made by Data General chairman Edson de Castro: 'The 6000 is designed to be as closed a product as IBM thought it could get away with in today's open system environment' – referring to IBM's use of its proprietary Micro Channel Architecture (at the launch of his company's new 88000-based AViiion line, as reported by IDG).

In fact, the new buzz word at IBM is 'open'. This isn't really a move to user-friendliness, rather a recognition by the company that it's stuffy, there-is-no-standard-but-IBM attitude had become a liability in a market place that was accustomed to having a broad choice in both hardware and software. This was a carry over from the heydays of mainframes when the company could get away with it – after all, only two years ago, 80 per cent of IBM's revenue came from mainframes, mid-rangers and peripherals; but the company realises that future growth will be in the *personal* end of the market.

The 1982-model PC was seen as technically staid for its time, and thus the company's PC reputation was born and carried right up to the PS/2 line. The first Risc-based range developed by IBM supported that thinking – but it was also seen by many as a stop gap in the Apollo/Sun market. The gap-filler was the new range of Risc-based, Unix platforms: the four-model Powerstation family and the five-model Powerserver group, both offering POWER (Performance Optimisation With Enhanced RISC) Architecture, which, we are told by IBM 'separates the processor into three functional units that permit concurrent execution of multiple instructions' – for more detail, see the box item, Parallelism.

(For a detailed background on Reduced Instruction Set Computers, see 'Risc-y Business' in our December, 1989, issue.)

Powerstations

ENTRY-LEVEL FOR a standalone Powerstation is 'under \$10,000' for a base model 320: 8Mb RAM, a single high density 3.5-inch floppy drive, a 23ms 120Mb hard disk, a 19-inch monochrome monitor with a resolution of 1280 x 1024 pix-

els, an Ethernet adapter, mouse and digitising tablet ports, a single parallel and two serial ports, four MCA (Micro Channel Architecture), and two memory expansion slots, all bundled with Aix 3.0 and a graphical user interface. Note – the hard drives mentioned in this article, with the exception of the 120Mb unit available for the model 320s, are all new drives from IBM, specifically developed with the Power series in mind.

In anticipation of software that can take advantage of it, there is also a high-speed (220Mbits/sec) optical serial port. Graphic processing power is supplied by TI's 50MHz TMS34010 chip with 512K of video RAM and 512K DRAM for window management; I/O is handled by the new CMOS, 8MHz 80186; overall system speed is rated at 20MHz. The system uses a 64-bit memory bus and has an 8K instruction cache. IBM includes a 24-hour, 7-day warranty and software service for 12 months in the price.

Fully configured with 32Mb of RAM and two 12.5ms SCSI (Small Computer System Interface) drives, the model 320 will be priced about \$26,000 when shipments start in September. Performance for these low end System/6000s is quoted at 27.5MIPS (Million Instructions Per Second), 45K Dhrystones and 6MFLOPS (Millions of Floating Point Operations) – for comparison, a 10MHz AT

IBM vs. Cray

AS REPORTED BY Newsbytes, an independent study at the Lawrence Livermore National Laboratory in California has shown the new IBM RISC/6000 model 530 workstation capable of performing certain calculations faster than a Cray Model X/MP 4/16. As part of a study called the Massively Parallel Computing Initiative (MPCI), the IBM workstation was pitted against the Cray in a standard nuclear reaction test called the Monte Carlo radiation transport benchmark test. Results showed that the RISC system ran the test 10 per cent faster than the Cray, and a packet switched network simulator ran 50 per cent faster.

Lawrence Livermore spokesman Steve Wampler, said the tests show that certain microprocessors in the IBM system run faster than those inside a Cray or other supercomputers. For instance, he said, some leading microprocessors can now run scalar code faster than supercomputer processors. Scalar codes are those codes for which low-level

operations must be performed in sequence, in a manner similar to a craftsman producing one shoe at a time.

Supercomputers, however, are still five times faster than microprocessors in running complex, lengthy calculations called vector processing, although the difference is expected to narrow in the next five years.

Lawrence Livermore's MPCI, in which 126 microprocessors will work in tandem on a BBN Advanced Computers TC 2000 computer, will examine the frontiers of parallel computing. The lab's decision to investigate massively parallel computing was fueled by revolutionary advances in the past four years putting more and more computing power into microprocessor chips for personal computers and workstations.

In the \$10 million, three-year project funded by the Department of Energy, scientists plan to put their science codes, for instance the models used to track the effects of global warming, into the MPCI computer.

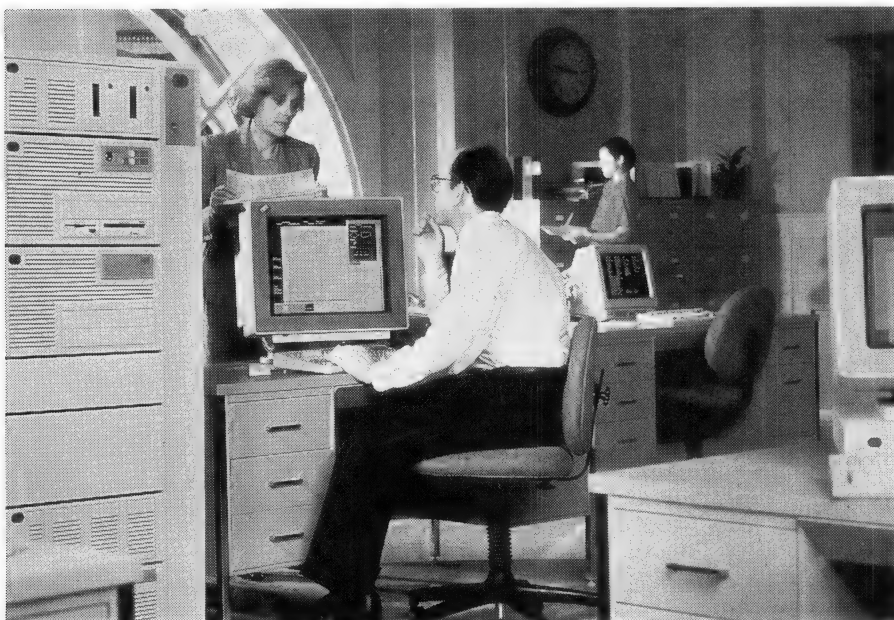
measures in at 0.82MIPS, 13 Dhrystones and 0.2MFLOPS, while IBM is rating its PS/2 486 at around 1.5MIPS, 23 Dhrystones and 0.9MFLOPS.

The base model Powerstation 520 adds a 17.5ms 355Mb SCSI hard drive, six more memory expansion slots and MCA slots. Memory can be expanded to 128Mb and disk storage to 2.5Gb. The series starts around \$35,000 and is upgradeable to a model 530.

The 530 has the same base configuration, but is fitted with 16Mb of RAM, a 128-bit memory bus, a 64K data cache, and a clock speed of 25MHz – performance is rated at 34.5MIPS, 61 Dhrystones, and 10.9MFLOPS. Systems are priced from \$65,000.

The Powerstation 730 adds high-performance graphics capabilities to the 530s with a Floating Point Graphics Protocol (FPGP) for improved rendering of images and NURBS (Non-Uniform Rational B-Splines), a mathematical function which facilitates a generation of precise curves and surfaces. The standard 19-inch 1280 x 1024 pixel color display system can show 256 colors from a palette of 16.7 million; a 24-bit display option allows all 16.7 million to be shown. Prices start around \$120,000.

At the Powerstation launch, IBM also announced three graphics development kits: GL (Silicon Graphics' Graphics Li-



Top of the System/6000 line is the rack-mounted model 930. The market is waiting to see if IBM has created competition for itself, worries for 'traditional workstation suppliers, or even a new market.

brary), graPHIGS (an ANSI-based library of graphics sub-routines that is used across the IBM range, from PS/2s to mainframes), and the AIX windows tool-set for graphics windows management.

Power-servers

WHILE THE Powerstations are primarily intended as standalones, the Power-servers are offered as high-performance file servers. The model 320 in this range is similarly configured to its Powerstation 'brother', with a 150Mb streaming tape drive added and an additional 8Mb of memory and a 12.5ms 320Mb hard drive – it's priced from \$26,000.

The range also includes a model 520 and 530, and a 30MHz model 540 with a 19ms 670Mb SCSI hard drive, priced from \$160,000.

The rack-mounted 25MHz Power-server 930 (from \$110,000) is designed for heavy server applications and is expanded by adding 'drawers': the base configuration has three drawers as standard – a power distribution unit, a processor drawer that includes the processors, plus a CD-ROM drive (one additional half-height device is supported), and a SCSI device drawer supplied with an 8mm tape drive unit and a 670Mb hard drive.

Up to three additional SCSI drawers

for four half-height devices can be added – these support either a 670 or 857Mb hard drive. An Asynchronous Expansion drawer can provide an additional eight Micro Channel slots to support 8-, 16- or 64-port asynchronous adapters. There is also an 9-track, reel to reel Tape Drive drawer, and a stand-by battery backup unit.

Xstation 120

TO ROUND OUT the range, the diskless Xstation 120 was introduced at the same launch. The base configuration (about \$4000) can run simultaneously in a Token Ring and Ethernet network. It includes I/O and graphics processors, 512K system RAM and 512K video RAM, serial and parallel ports, and a range of color and monochrome monitors. System memory is expandable to 8.5Mb, and video memory to 2Mb.

AIX 3.0

WHILE DEVELOPING the System/6000 hardware, IBM made a concerted effort with enhancing its Unix implementation, AIX. The result was version 3.0, optimised to run on the 6000's RISC-based hardware. It plays court to almost the whole gamut of Unix standards from Posix (which is still mainly in the draft stage) and the X/Open consortium's

Common Application Environment (CAE), to the Open Software Foundation's (OSF's) Level 1 Application Environment. AIX 3.0 also provides 'a high degree of compatibility' with AT&T's Unix System V, BSD 4.3 and IBM's implementation of Unix for the predecessor to the System/6000, AIX/RT.

IBM fully realises that to meet its ambitious goal of capturing 20 per cent of the workstation market within several years, the Power series is going to need a huge base of powerful software. A great deal of effort has gone into ensuring that software developers can port their products to these new machines with little effort – and to develop new applications on them.

As the enhancements in AIX 3.0 show, the company is serious about making the System/6000 a formidable contender against the already mature – and technically sophisticated – products from the opposition.

A key component in the new AIX release is the Virtual Memory Manager (VMM) which manages the allocation of real memory, paging space, and virtual storage segments. Part of its task is to map all open files into virtual memory which allows paging direct to disk. In Unix, recovering from a disk crash can be slow and complex because of the method used (file consistency checking); AIX 3.0 journalises the file system (not the files themselves) into a database which ensures consistency and makes recovery a fairly straightforward task.

Version 2 was criticised because its Logical Volume Manager was based on the concept of 'minidisks'. Users found this restrictive because the minidisks couldn't be larger than the physical disk, and the disk space used for a minidisk had to be contiguous; also, in most cases, the only recovery from a disk failure using this system was to restore from backups. Now, AIX divides the physical disk into partitions; a group of partitions is a logical volume; a logical volume can contain physical partitions from more than one disk – so it can be larger than the physical disk.

Also new is the System Management Interface Tool (SMIT), which provides users with a menu-driven interface to a set of tools for configuring devices attached to the system, disk management, accounting and auditing services, network maintenance and system diagnostics.

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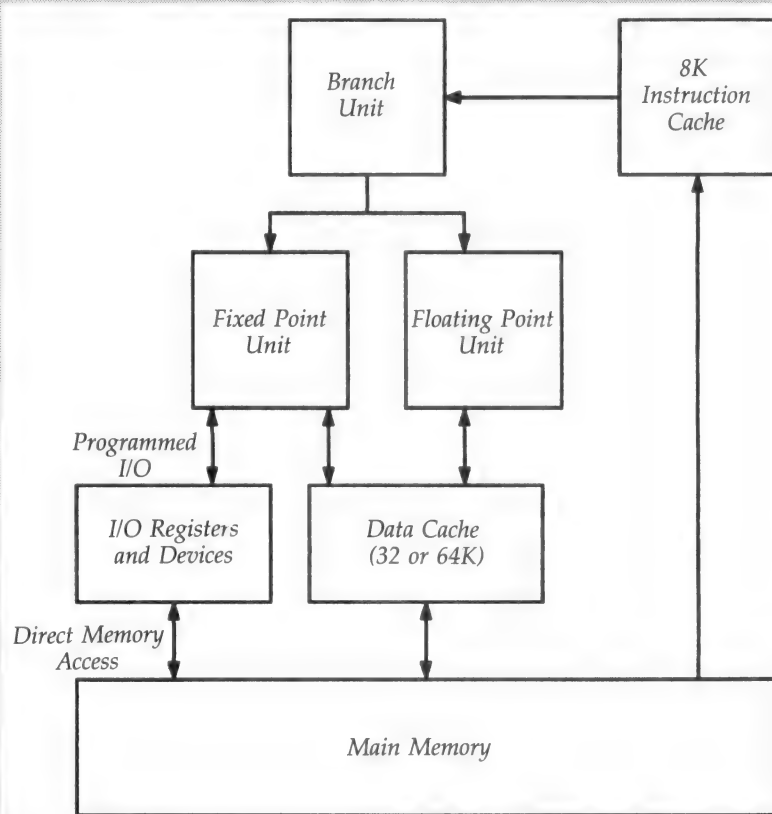
PERFORMANCE Optimisation With Enhanced RISC (POWER) is how IBM describes its second generation of Risc processors, of which there are three – 20, 25 and 30MHz versions. All of them have the same architecture (refer to the diagram) which uses three independent functional units permitting parallel execution of up to four instructions in one clock cycle.

The Branch Unit fetches all instructions, executes those it can, and passes the others to the two arithmetic units, Fixed Point and Floating Point. The Branch can decode the next instruction while the arithmetic units are completing their calculations – this reduces the delays associated with branching operations in most previous processors. It performs a single logical action and a single instruction per clock cycle.

The Fixed Point Unit contains thirty-two 32-bit general purpose registers and performs one operation per cycle, while the Floating Point Unit can perform two 64-bit operations concurrently in a single cycle. The latter's data flow is pipe-lined (over-lapped) so it can initiate a new 64-bit operation per cycle.

Each of the three Units has its own set of registers that provide data as it is required. The processor uses two independent caches, one for instructions (8K in all models), and one for data (32K in models 320 and 520; 64K in the others).

The optimising compiler for the 6000s ensures that frequently used data is available in a register when it is required by the processor; this avoids time-con-



suming main memory access. When possible, the compiler also sequences instructions to obtain a mix in which

branch, floating point and fixed point instructions can be executed simultaneously.

IBM are now supplying the documentation for AIX online, based on hypertext techniques.

Unix-ware

WHILE THE Unix camp was in disarray over standards, software developers weren't overly enthusiastic about the market. For IBM to reach its marketing target, that problem needed to be addressed quickly. In fact, it seems that the new range will have a much broader appeal than the classic workstations from Sun and Apollo: that means that most of the 20 per cent IBM is after could come from new business outside the graphics arena, without hurting the competition too badly.

Concurrent with the release of the System/6000, there was a rash of software announcements from third parties spanning almost the entire gamut of ap-

plications. BIS Banking Systems, traditionally developers of mainframe packages, for example, released BIS ACTS, a package for international bond dealers. ACTS (Advanced Capital Trading System) is a decision support tool that BIS says will improve productivity and monitor risk and performance.

It gives traders real-time price information and comprehensive position-keeping while enabling rapid deal entry. It automatically registers each transaction via the TRAX system provided by the Association of International Bond Dealers.

As another example, US companies The Ultimate Corporation and Vmark Software, reported that they had completed an implementation of Ultimate's ULT/ix software for the System/6000.

UniVerse, Vmark's application development system, enables Pick and Prime

Information-based applications to run on more than 100 different Unix-based computers. ULT/ix features enhancements to uniVerse in support of Ultimate's functional extensions of standard Pick, and is presently available for the IBM/RT, Bull DPX/2 and DPX/2000, HP Series 9000 and Sequoia 300 platforms.

The rash of releases came about because IBM had given unprecedented support to developers before the launch – an indication of that can be seen in the fact that there were 250 working 6000s installed at that time.

Of course, the big question is 'will it be a success?' Only time will tell, but a comment from a Sony director (and workstation competitor) was food for thought: he noted that only entrepreneurs had been really successful in the workstation market and no mainframe maker had done so. □



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PCEXPRESS

FOR PC POWER

If your organisation is currently suffering under the weight of 'disaggregated data', Steve Keen has found a solution . . .

SUPERCALC 5 and Lotus 123 Release 3 are introducing the world of PC users to the power of multi-dimensional analysis, and for most users that will be a revelation. But there are many large companies – Coca Cola, Burns Philp, Westpac, Qantas, Samuel Taylor, Shell – which are already well acquainted with the concept, and to whom Lotus' implementation of it will look like Captain Ahab against the might of Moby Dick. For to continue the nautical analogy, Lotus Release 3 scratches the surface of the ocean in which lurks pcExpress.

PcExpress is almost impossible to categorise. It transcends the analytical limits of both spreadsheets and relational databases, though it is not a replacement for either: spreadsheets are still best for ad hoc analysis, and relational databases are far better suited to recording transactions. It incorporates freehand as well as business graphics (though it's no match for dedicated packages here), and a sophisticated communications module.

Like the new releases of Lotus and Supercalc, pcExpress derives its power from multi-dimensionality: the ability to see how a problem is affected by three or more dimensions, rather than the two that are the practical limit for a second generation spreadsheet. However, Lotus is effectively limited to three dimensions. You can easily show monthly sales across the top of a sheet, the relevant products down the column, and results from different stores on different pages of a multi-page sheet; simple SUM formulas will consolidate overall company results on the top page of the file. But if you want to break sales down further by salesman, you have to retain a separate file for the salesman at each store, and derive the consolidated

result for each store by product by a SUM formula referencing that separate file.

Your initial design of the spreadsheet also compromises your ability to view your data from different perspectives. Your consolidated sheet will easily indicate total product trends over time – it's on the top page of the spreadsheet. But if you wanted to instantly compare trends for stores over time, tough; instead, you have to view each store's results on a different page of the file, or redesign your model.

It's also very hard to look 'through' your cube of data: once you have decided to view sales by product by month (with stores providing the third dimension), you can't see sales by store by month without designing an entirely different 3D spreadsheet (with product providing the third dimension). You can't simply flip the cube around, to see your data from a different and more illuminating – perspective.

PcExpress suffers from none of those limitations. Its variables – such as SALES, in this example – can have up to six dimensions, like a spreadsheet with six axes. SALES, if dimensioned by PRODUCT, STORE and MONTH, would be a cube of data effectively identical to a Lotus 3D spreadsheet. But it could be a four dimensional object simply by adding a SALESMAN dimension – with the result that the one variable stores all the information that in Lotus 3D would have to be stored in one multi-page spreadsheet for the company, plus a multi-page file for the salesmen at each of your stores.

Simple commands, given either from a command line or from a menu driven system, allow you to see this data from any perspective. The command line TABLE TOTAL (SALES) gives the total sales for





the company. TABLE TOTAL (SALES, PRODUCT, MONTH) shows you the same view of your data that you could get from the Lotus file above; but you can also see sales over time from each store with the command TABLE TOTAL (SALES, STORE, MONTH) – something Lotus 3D can't do. You can twist, flip, forecast and summarise this multi-dimensional cube of data to your heart's content.

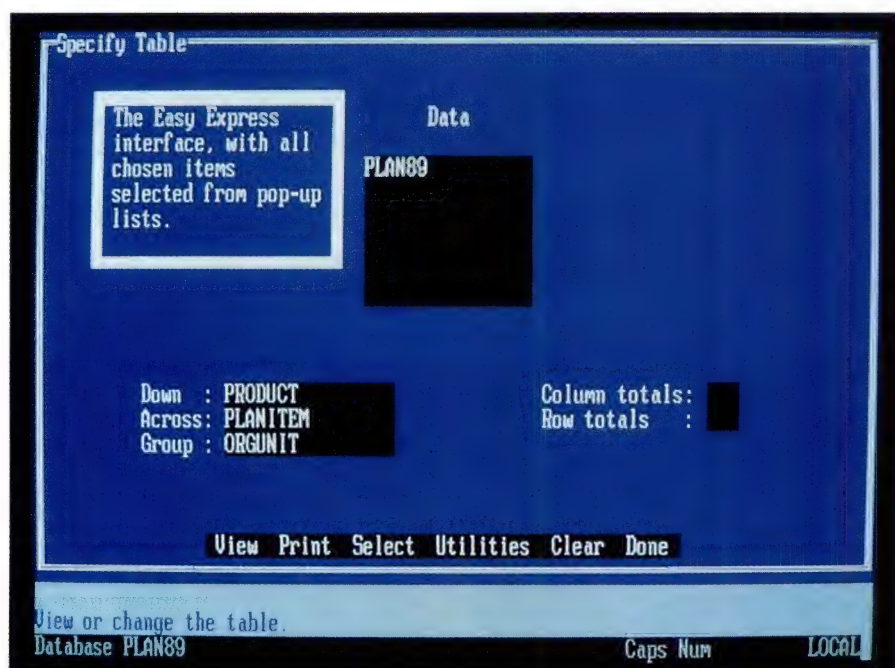
From its mainframe origins it inherits the concern about data and data processing integrity, so the free-range equations of the spreadsheet are out. It also has mainframe quality statistical and forecasting tools built in, and a 4GL which lives up to the name. It adds up to the most powerful data analysis tool that I have yet seen on a PC, one which is quite capable of managing the affairs of a multinational, or analysing sales data for a large scale market researchers. Its current users reflect that need for power: the confectionery corporations Cadbury, Rowntree and Mars wage war against each other with it, Prospect County Council prepares its decentralised budgets with it, Westpac manages its loans portfolio, and so on.

Unfortunately, it's not cheap and, while the program will run on an XT, a fast '286 is the minimum configuration for large database.

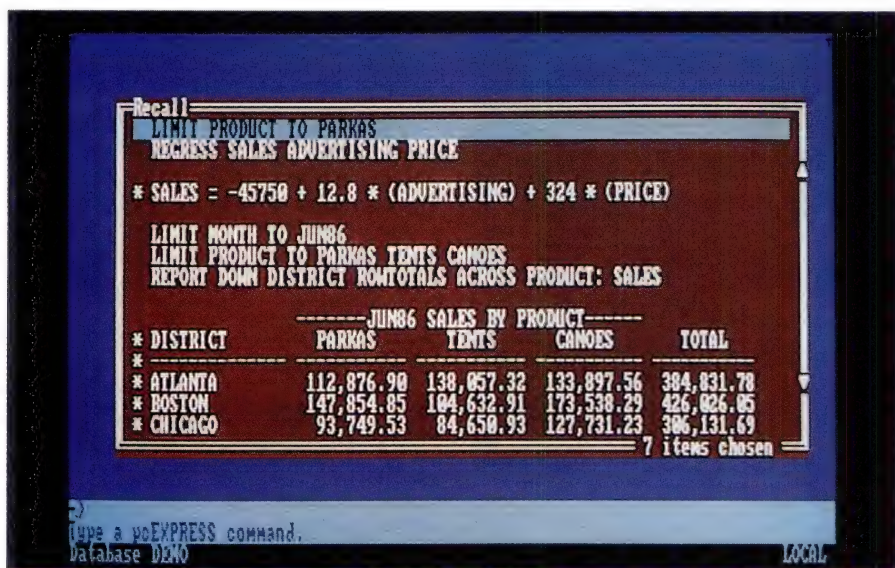
PcExpress is one of the few business packages left that is still copy protected, and its authors, Information Resources, show no signs of budging on this. It writes hidden files to your hard disk, and can't be backed up; fortunately, the level of support from the local distributor, Information Resources, is quite high (disks are duplicated locally), so disk crashes don't mean a total catastrophe.

You can also use the program in a key-disk' fashion after you have installed it in copy protected mode on another computer. There are two versions: one for standard PCs and a special version for '286 and '386 computers with large memories – above 3Mb of RAM. In addition to providing much greater speed, it adds a number of features that are missing from the standard package.

One of these is the Data Reader, which facilitates importing data from traditional relational databases. The standard program uses a worksheet approach (rather like Javelin) to import data from 123 and DIF files. The Data Reader sidesteps the worksheet procedure with a program driven method of importing foreign files (for those with limited memory or budgets there are also the file input/output com-



The menu driven interface, Easy Express, provides far more access to the power of the underlying program than does dBase's Command Center, for example.



PcExpress' recall screen records the last 250 commands for editing or use as a macro. The recall screen can also be used to cut and paste data between different windows, including a remote communications window.

mands which provide similar powers, though not as automated).

The pcExpress data model

PCEXPRESS' POWER is derived directly from its data model – a multi-dimensional

cube. A pcExpress database is built around any number of variables – SALES, EXPENSES, PRICE, ADVERTISING, BUDGET, for example – which have dimensions. The dimensions can be such things as STORE, MONTH or PRODUCT – with each

dimension corresponding to an axis on a spreadsheet.

SALES, for example, could be dimensioned by MONTH, PRODUCT AND STORE. One value of SALES would show the number of the PRODUCT Dryabone sold through the STORE Bondi Junction in the MONTH June. If you had entered 20 products into the PRODUCT dimension, 10 stores in STORE and 12 months into MONTH, then the command TABLE SALES (which invokes pcExpress' spreadsheet-like data entry and display system) would in effect invoke ten spreadsheets, with each one showing the sales of all of your twenty products over a 12 month period in each store. You can move from sheet to sheet simply by pressing the PgDn key.

If variables have the same dimensions, then they are related and can have matching calculations performed upon them. EXPENSES could also be dimensioned by MONTH, PRODUCT and STORE. The command TABLE REVENUE – EXPENSES would generate a store by month by product profile of where you made losses, and where you made profits. The same calculation would be next to impossible in a 2D spreadsheet, and would still take a lot of work in a 3D version.

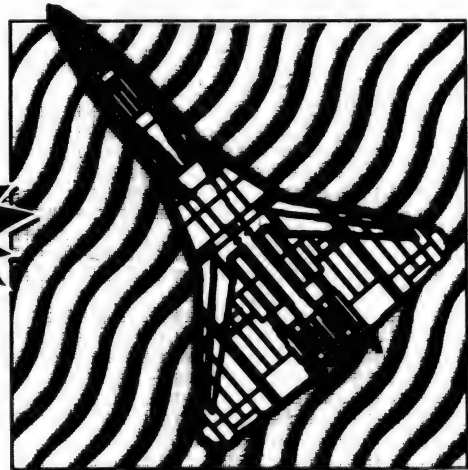
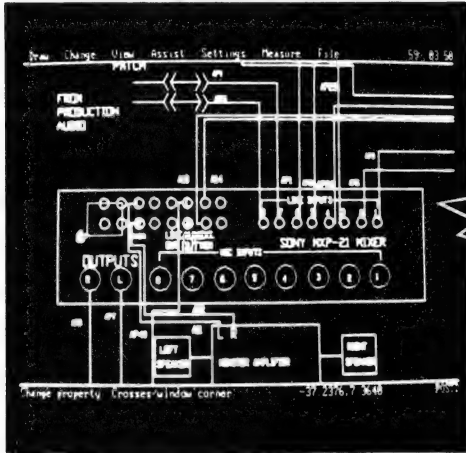
Sitting between and above dimensions are RELATIONS. Each month of a year, 1989 for example, is related to the year 1989, with month and year both being dimensions. Data is entered on a monthly basis, but a yearly profile of sales can be generated with the command TABLE TOTAL(SALES, YEAR) – with the relation between month and year doing the addition automatically.

Formulas – which are stored in individual cells in a spreadsheet and have to be copied to be active elsewhere – are stored in the database just like a variable. A formula such as REVENUE = PRICE * SALES acts across all the dimensions of both variables, so that one formula automatically calculates the revenue for each product in each store, each month. If you add extra values to the dimensions Month, Product or Store, the calculation is automatically made for those latecomers – no need to copy the formula into a new range as with a spreadsheet.

Databases

A PCEXPRESS database can be up to 64Mb in size, and can contain any number of dimensions (corresponding to the axes of a spreadsheet), any number of variables which are described by those dimensions (with each variable having between zero –

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a single number – and six dimensions), formulas which operate on those variables across all relevant dimensions, and programs – which can make the entire database a menu and forms driven turnkey operation. There is only one disk file for this collection – something which large users come to appreciate – and the file can spread across disks.

PcExpress has two interfaces: a command line system, with compact but powerful syntax, and a menu driven interface called Easy Express. Using its built-in programming language, you can create a third, tailored interface for your application.

The command line provides power way beyond that of a relational database, even one with SQL features which lets you join several files to make a query. With SQL, you have to specify what it is that relates separate objects (like Sales and Customers) in every join. In pcExpress, different variables (which correspond to different tables in the relational model) are automatically related by the dimensions they share.

You can also capture command line statements from a recall window, and effectively assemble programs on the fly. The recall window is available to you when writing a program, which means that most developers prototype their work at the command line before committing it to permanent code.

Most users will initially confront Express through its menu driven interface Easy Express. Again, because Express variables are automatically related by the dimensions they share, this interface provides far more access to the power of the underlying program than does dBase's Command Center, for example. Easy Express is a menu system, with commands such as Table, Analyse, Graph. Choosing the Analyse option generates a form, where you enter the names of the variables you wish to work on, and the relevant dimensions.

Formulas and expressions

WHILE BOTH THE command line and Easy Express provide far more power than any spreadsheet, pcExpress can further be tailored as a decision support tool by programming. The programming language is a genuine 4GL, fully integrated with its database. For example, in addition to the simple WHILE ... END WHILE construct of most relational systems, pcExpress uses a FOR dimension .. statement. If there are 17 values in the dimension, then

An example application

IN THESE DAYS of deregulation, what are known as prudential guidelines have replaced the old system of requiring banks to have a set ratio of reserves to loans or a set percentage of deposits in particular securities. One such set of guidelines involves risk analysis, where the value of assets held by a bank (basically the value of loans it makes to the public) has to be modified by Reserve Bank estimates of how risky those assets are: there's no sense in having lots of 'assets' if most of those are likely to default.

The Reserve Bank then compares the risk-adjusted value of assets to the level of shareholders funds, to work out whether the bank is within prudential limits, or has overextended itself. Banks used to produce the overall corporate risk profile using spreadsheets. The raw asset information was provided from portfolio managers, and came in the form of hundreds of spreadsheets. The information had to be aggregated, from portfolios level to unit level, then divisional, and past that to bank overall. The gross assets were then multiplied by the Reserve Bank's risk ratios for each type of asset to work out the bank's risk-adjusted asset backing.

It was a time-consuming and complicated process. The consolidation task itself took days of computer time, while the hundreds of equations involved were hardly straightforward to code in Lotus 123.

Using pcExpress, a bank can still derive its information from spreadsheets maintained by managers. However, the data consolidation occurs by importing the sheets into a pcExpress database (at a speed of roughly one every five seconds). One pcExpress program (which basically consists of a series of equations) then calculates the risk ratios in under an hour.

What is more, the consolidation doesn't mean that the risk profiles of each separate unit is lost in the total picture – as used to happen with Lotus. The equations work across all dimensions, down to the portfolio level, allowing Westpac to assess not only its total performance, but the performance of each of its components.

PcExpress also condenses what used to amount to a one metre stack of documentation into a set of graphs, which allow very easy interpretation of what is literally a mountain high pile of information.

pcExpress will repeat the following instruction 17 times – no need to increment counters, check error conditions and so on. That command is usually employed in tandem with the LIMIT command, which limits the currently active elements of a dimension to those specified by the user. When generating a report you could, for example, specify that you were only interested in sales for the months of MAY88 and MAY89. The minimum code required to get those months for you –

```
LIMIT MONTH TO GET(MONTH)
```

This generates a ? prompt, with the subtitle 'Please enter a value for MONTH'. If you want to replace that with a point and pick a pop-up window showing the available options for MONTH and allowing multiple choices, the necessary code is –

```
LIMIT MONTH TO GET(MONTH, MANY,  
CHOOSE VALUES(MONTH))
```

PcExpress formulas can be stored in

and executed from programs, in addition to having them as elements in your database. The manual gives the example of storing all items in a financial report in one dimension, and calculating them using three lines of formulas in a program. As well as the range of formulas that most spreadsheets contain, pcExpress supports three kinds of forecasting, including one which takes account of seasonal variation. The results of a forecast can be stored in a separate variable and compared to actual results, and you can create a budget variable and compare it to actual results using formulas working across the same dimensions.

Graphics

PCEXPRESS PROVIDES a full range of business graphics and they can be annotated using a DRAW command to provide freehand graphics; sophisticated developers have developed mouse driven decision support systems where, for example, a report for divisional sales in Queensland is chosen by clicking on Queensland in a map of Australia.

The graphs are not in the league of

Lotus Release 3, but their real strength is in turning data into information. If you have a variable SALES dimensioned by SALESMAN, MONTH and PRODUCT, then the single command GRAPH TOTAL (SALES, PRODUCT) produces a separate graph of monthly sales for each salesman. Replace the word PRODUCT in the above command with SALESMAN and you see monthly sales per product. Try doing that with a spreadsheet.

Version 2

VERSION 2 OF pcExpress was recently released. As tends to happen with programs with excellent underlying data structures, a simple modification to that structure has resulted in a potentially dramatic extension to its power and applicability. Say you have a variable sales which shows sales of products to customers by month by district (its definition would be 'Define Sales decimal <month product district customer>'). Not all customers would buy products each month, nor would they buy all products, let alone in all districts. As a result, your variable would have lots of empty cells. The new

release deals with this with what it calls 'conjoint dimensions'.

This lets you define a dimension as the product of joins between two other dimensions. Let's say that your customers normally bought specific products. You could then define a dimension custprod which was the conjoint of customers and products - 'Define prodcust dimension < product customer> and enter the relevant combinations - 'maintain prodcust add < Alexanders> <baclava Abduls> ...'. This

means that only those combinations of the two dimensions which normally store data are actually saved to disk, drastically saving space in a large file. This 'conjoint dimension' could itself be used to dimension a variable, effectively breaking the limit of six dimensions per variable for really complicated applications.

This has had a major spinoff: effectively, indexing. You can now give the command 'Limit prodcust to product coffee' and automatically select only those customers who purchased coffee from you. In the future this promises the ability to use pcExpress as a means of storing transactions (as people currently do with the likes of dBase) as well as analysing them; however, the current interface doesn't make it easy to use this feature in everyday operation, and it will mainly be a tool for the sophisticated developer wishing to conserve disk space, or create specialised variables.

Amongst other enhancements, the programming language now allows for local variables in programs, which adds to the flexibility of programming. However, the local variables can't be dimensioned, like full variables in the database. □

Product Details

Product: pcExpress
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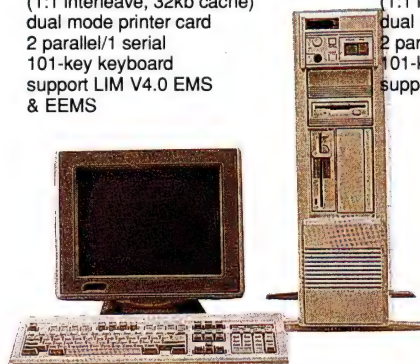
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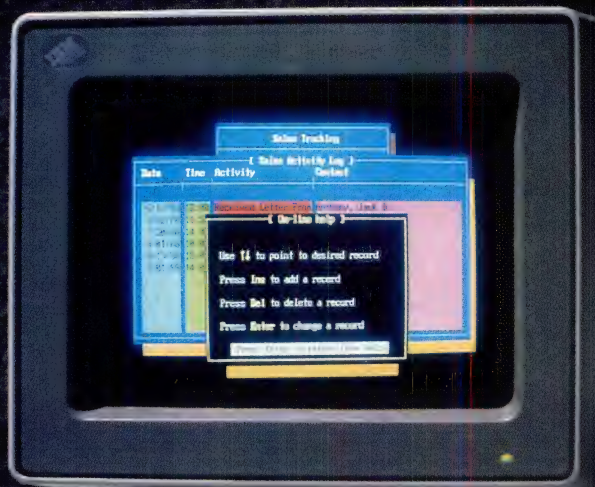
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CLARION

Steve Keen reports on a very useful combination of a prototyping tool and a programming language – it's more than a database, it's a tool for Computer Aided Software Engineering.



PROFESSIONAL DEVELOPER

THERE ARE basically two schools of thought in databases. The older school designs a database using a programming language, either a general one like C or a specialised language like Cobol or dBase. The newer school tries to do everything using a 'data dictionary'. The dictionary stores descriptions of the menus, the files, screen forms and reports in an application and runs the application by consulting the dictionary. In general, the newer school – represented by programs such as Advanced Revelation, Dataease and Zim – has the advantage, if only because it normally requires much less work to design a database that way than to code it.

However, the old school can fight back using 'applications generators' (AppGens), which automatically generate most of the standard code that goes to make up any database (the two most popular microcomputer databases, dBase IV and Paradox, both offer applications generators). Whether this tactic is successful depends on how easy the AppGens are to drive, whether they implement all the features that a designer would normally want to have in an application, and how elegant and intelligible is the code they produce.

While Paradox's AppGen is reasonable but not brilliant with the above criteria, dBase's doesn't do too well at all. (For a complete review of Paradox 3.0, see the April issue of YC.) However, Clarion blitzes the criteria, with a truly brilliant AppGen that produces code any professional programmer would be proud of. Using Clarion's Designer, in a matter of hours you can put together a standalone relational database system with fancy menus, attractive screens, windowed forms, helpful pop-up windows, complete data integrity checking and networking support. Clarion may well contain what you had hoped to find when you took the shrink-wrapping off your copy of dBase IV.

Dissatisfied users of dBase and similar packages are one of Clarion's two target audiences – the other is users of Cobol. To the latter group, it offers a database programming language specifically tailored to the PC, with a far cleaner syntax than Cobol. To the former, it offers a more powerful language, and superb tools for developing standard applications and prototyping complex ones. To both, it offers the ability to design an application and create a standalone EXE file, which can be distributed without having to pay royalties to Clarion.

The heart of Clarion

THE TWO STRENGTHS of Clarion are its database oriented programming language, and its superb applications generator. Since most users, even experienced ones, are likely to use the Designer before they cut any code in Clarion, it is the Designer which really qualifies as the heart of Clarion.

Table	
Procedure Name :	
Procedure Title :	
Setup Procedure :	
Update Procedure :	
Access Key :	
Help ID :	
Record Filter :	
Hot Procedure :	
Hot Key :	
Combine with :	
Model Name :	

Clarion's Designer – the application generator – is all menu driven. First 'the base procedure' is named and then a pop-up asks the user to specify Menu, Table, Form, Report, or Other. The Table pop-up is shown here.

The design process has two components – creating the files and indexes, and creating the program modules. The two components are linked through Designer's top level overview of your application, which shows the files in an application in a small left-hand window, and the program modules in a larger right-hand window.

As you create files, their names appear in the left-hand window; as you create program modules, their names occupy the right of the screen, with lines showing the flow of program logic from one module to another, and bracketed terms describing the function of each module. You move between the two windows simply by using the arrow keys.

The three 'magic' keys in the Designer, and in Clarion code in general, are Insert, Enter and Delete. Press Insert, and a new record is created; press Enter, and you alter the highlighted record; press Delete, and you delete the highlighted record. This occurs both when you are designing your application, and in the application the Designer will create.

Field types include memo, three sizes of integers, and arrays (with up to four dimensions) as well as the standard decimal and string types (dates are stored as a special type of string). You can attach a picture to a field to control valid input, with Clarion's pictures giving you far more control over appearance and data entry into fields than you get in dBase IV.

To design an index for a file, you simply move sideways from the field definition area and press Insert to create an index, Enter to edit an existing index, and Delete to delete one. Once an index has been named, you add fields to the index definition by pressing Insert, and Clarion then displays a pop-up with the available field names, and you can point and pick the ones you wish to use. Any number of indexes can be created for a file.

The real beauty of Designer becomes apparent when you start designing the program modules to control your application. Most database applications can be described in the following manner – users pick options from a menu; the chosen option normally gen-

erates a table with a sorted listing of the contents of a file; a form will be used to enter new data into the file; a report will print out the contents of files; and occasionally, there are other procedures which do specialised tasks. All five module types can be defined using the Designer.

When you start, you are required to enter the name of a 'base procedure'. That procedure sits at the top of the module definition side of the Designer, with the designation ToDo sitting next to it. Press Enter, and a pop-up appears asking you to specify whether it should be a menu, table, form, report, or other. Choose menu, and it generates a blank bordered window (you have control over window and border colors and attributes), into which you can insert four types of fields. The simplest, and most common, is a menu field, which when selected by a user will call another procedure. But you can also have fields which look up values in files, or which you can use to limit the display of invoices to those pertaining to a nominated customer, and calculated fields.

Designing tables, forms and reports

A SIMILAR procedure applies to designing tables, forms and reports. With tables, you first nominate a primary file to be displayed by the table. Then you place fields from this file on the table. The fields can be placed into two areas, a fixed area which remains constant, and a scrolling area where multiple occurrences (such as multiple lines in an invoice) can occur. With tables, the available field types expand to include a locator field, which is used to search the scrolling area. Reports are divided into report header, page header, body, page and report footer areas, and you can insert fields from several files into any of these regions.

Compiler Errors	
5 MESSAGES FOUND IN SAMPLE.CLA	
E 145	@3/3: 'KEY' CANNOT BE DECLARED AT THIS LEVEL
E 145	@4/4: 'RECORD' CANNOT BE DECLARED AT THIS LEVEL
E 7	@6/6: 'BLARG' IS AN INVALID DECLARATION STATEMENT
E 142	@8/8: '.' WAS NOT EXPECTED HERE
Press Esc to correct errors	
Press Enter to continue	

The Compiler in Clarion doesn't do what its name might imply – it creates the pseudo-code to be run by Clarion's interpreter, or by a run-time utility.

A table normally has an update procedure attached which lets you add, edit and delete records. This is specified in the definition of a table procedure, and is normally a form – which is itself another procedure. Forms are primarily linked to the file used by the table, but the update procedure can update up to four files, not simply one, which makes it possible to use Clarion to do all the cross-posting to files which is necessary in any accounting application.

As you define your various procedures, the top level of Designer shows the flow of logic from one procedure to the next. You can also hang 'hot key' procedures off any module, so that the user can immediately access a desired aspect of the program without

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272
fonts

SOFTWARE
Express


```

COST = 0
SELECT(?PERIM)
CYCLE

CASE FIELD()
OF ?WALL
IF WALL % 100 > 11
BEEP
SELECT(?)
ELSE
INCHES = INT(WALL/100)*12 + WALL%100
OF ?TYPE
EXECUTE CHOICE()
AREA = STANDARD
AREA = EUROPEAN
OF ?REPEAT
HEIGHT = INCHES
IF REPEAT = 'No'
ERASE(?EVERY)
SELECT(?PRICE)
OF ?EVERY
PAPER.CLA T2:45

```

```

! ZERO TOTAL COST
! START ON THE FIRST FIELD
! LOOP AGAIN

!EDIT THE FIELD ENTERED
!EDIT WALL HEIGHT
!MORE THAN 11 INCHES
!YES - SOUND KEYBOARD ALARM
! REENTER THE FIELD

!CONVERT FT/IN TO IN

!EDIT WALLPAPER TYPE
!WALLPAPER TYPE
! SET AREA COVERED BY STD
! SET AREA COVERED BY EUR
!
!EDIT REPEATED PATTERN

!IS THERE A REPEAT?
!NO - ERASE REPEAT LENGTH
! AND SKIP THE FIELD

!EDIT REPEAT LENGTH
CHR INS SCR

```

The Editor is a sophisticated programmer's tool and is integrated with Clarion's debugger, so that if any errors do exist, the Editor can move from error to error, highlighting the offending section of code. Note the language – the structure is much closer to that of a true programming language like C than it is to dBase or Paradox.

having to escape back through the menu system. For example, in an invoicing system, it could be desirable to have a hot key which calls the Enter New Customer procedure from your billings system, in case the person making the order was not already on file. You would press the designated hot key (Alt-C, for example), add the customer, and return to the billings system, without having to use the menu.

Setup procedures which are executed before the chosen option is called can be inserted before any procedure, and these setup procedures can be other forms (for example, a form requesting confirmation that the user deliberately pressed the Print key), hand-written Clarion code, or programs written in another language.

Once you've finished designing your program outline, you press Ctrl-Enter and Designer generates the Clarion source code, complete with extremely easy to interpret comments. The next stage after this is the Compiler. This doesn't do what its name might imply. Instead, it creates the Clarion pseudo-code which can be run by the processor, Clarion's interpreter, or by a run-time utility. This lets you actually test out your application, entering and deleting data, producing reports and so on, before you produce a standalone EXE program using the translator and whatever link program you possess (one is supplied with Dos).

As good as Clarion's AppGen is, there will still be times with a more complex application when you will want to edit its code, or insert a special module of your own. This is when you call on the Editor, a facet of Clarion which has been much improved over the original release. In the first version of the Editor, if you wanted to alter screen forms or printed reports, you had to do it the hard way, editing Clarion's equivalent of the @SAY, GET commands of dBase (fortunately, Clarion's screen painting commands were much more powerful than dBase's). Now, you can access the same screen and report painting commands that exist in Designer directly from the Editor. When you have finished painting to your satisfaction, the necessary screen code is automatically inserted back into your program.

The Editor rates as a sophisticated programmer's tool, rather than just a simple text editor. It is integrated with Clarion's debugger, so that if any errors do exist, the Editor can move from error to error, highlighting the offending section of code and displaying a help message. The Editor can handle two files at once in windows, it can copy both lines of text and rectangular blocks, and is programmable with macros, thus making it possible for you to automate the writing of control segments. There are little touches of great finesse, such as a special insert mode which will insert new code into a line without disturbing the alignment of comments on the same line.

The Editor naturally raises the issue of Clarion's language. Given its target audience, the structure of Clarion's language is much closer to that of a true programming language like C than it is to dBase or Paradox. There are syntactical rules to follow, such as the need to declare variables before they are used, which have only recently been tacked on to the more free-form languages of dBase and the like. It leans towards C with its somewhat spartan format, for example, sets of program statements are terminated using a full stop, which is closer to C's use of curly brackets than it is to dBase's specific END statements.

It also borrows a lot from different languages, showing a great deal of eclecticism and thought in its design. For example, Clarion handles type conversion the same way that C does – transparently. You don't need conversion functions as you do in dBase. The first character on a line is reserved for labels, and any normal statement must begin with a space. This 'old-fashioned' convention (to quote the manual) simplifies compiling and coding, because in other languages you have to add some special punctuation to indicate that a word is actually a label for a procedure, variable, screen and so on. It takes some getting used to, but the difference in power and clarity make the conversion worthwhile.

At the data processing level, the language automatically handles networking, transactions, and can have file recovery procedures built in. It supports the PC's memory as intelligently as does Paradox, with commands that can read in all records that will fit into RAM, thus dramatically increasing processing speed.

Overall, learning Clarion's language from the ground up would be as difficult as mastering Cobol or C, and I doubt that I could justify the effort if that was the only way you could program in Clarion. But the existence of Designer, and the quality of the code it generates, makes this task far less onerous. For the vast majority of applications, you can let Designer handle the bulk of cod-

The CLARION Helper

Help File : XXXXXXXXXXXXXXXXXXXX

Window :

Chained to:

Position :Float Float Fix

Attribute :White on Black

One of the utilities with Clarion is the Helper for creating context-sensitive help windows for the application. Others are the Scanner, which gives spreadsheet-style interactive access to the data in a single file, and the Converter, which can convert dBase II, III, DIF and Basic files to Clarion, and vice versa.

ing, and spend a short time writing the specialised bits of code that make your application distinctive.

Other utilities

A NUMBER of other utilities round out the Clarion offering. Most notable here are the Helper, which lets you create context-sensitive help windows for your application, the Scanner, which gives you spreadsheet-style interactive access to the data in a single file, and the Converter, which can convert dBase II, III, DIF and Basic files to Clarion, and vice versa.

Clarion is a PC representative of a Case tool – a Computer Aided Software Design. Such tools abound on mini-computers, where they normally work from a flow-chart to design a system, and then generate commands in a standard database language like Cobol, to actually build the desired database. They are rare on PCs, and Clarion is even more rare because it has written its own language to go with its Case system, rather than relying on a more established, but comparatively deficient, language.

As such, Clarion shows what can be achieved by the combination of a prototyping tool and a programming language. On the PC, it represents the pinnacle of the programming language databases, and in this respect it stands far above dBase IV or Paradox. Clarion also makes a bid for the first time user with Personal Clarion, a cut down version of Professional which doesn't offer the programming language or the compiler, but can still be used to design excellent, but non-customised, relational database systems.

Whether Clarion has the database world to itself is another question that begs comparison with the data dictionary programs, Advanced Revelation, Dataease and Zim. My own preference is for this approach over the prototype and program approach of Clarion, especially when Advanced Revelation offers such an advance in terms of database structure over any other database. But I could imagine that to disgruntled Cobol and dBase programmers, the step up to Clarion could be easier to make than the conversion to Advanced Revelation, Dataease or ZIM. □

Product Details

Product: Clarion Professional Developer

Distributor: Digital Solutions,

6 Wighton St, Margate 4019 Qld.

Ph: (07) 883 1851

Fax: (07) 883 1217

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NORTON COMMANDER AND XTREEPRO GOLD

DOS HAS HAD a justifiably bad reputation for unfriendliness. The poor user has to remember a vast array of commands, and type them in exactly right, complete with various arcane parameters. Even worse, as hard disks get larger, it becomes ever harder to remember which directories hold which applications, and how to get one started. As a result, there have been many menu programs, and even more utility programs, to help the novice and advanced user. The very best of these shells combine file and disk management, and menu functions.

Two of the best are XTreePro Gold and Norton Commander 3.0. They are derived from the original XTree and Norton Commander, which were radically different in basic design, philosophy and features. As each has developed, they have gained functions and features and now have more in common than ever before. Each still shows that different basic concept, and has some exclusive features.

Both can create, rename or remove di-

Are you frustrated with Dos? John Hepworth found both XTreePro Gold and Norton Commander 3.0 can relieve the tension.

rectories, view and edit files, copy files one at a time or in groups, change file attributes, and generally manipulate files and directories. Both come with a range of file viewers for various database, spreadsheet and wordprocessor files, while Norton Commander can view some .PCX graphics files. Apart from style and philosophy, the differences are that XTreePro Gold can have a single list of files in multiple drives and directories, while Norton Commander adds electronic mail for users of the US MCI mail system, and also has a

LapLink-style function to transfer files by cable from one computer to another at high-speed.

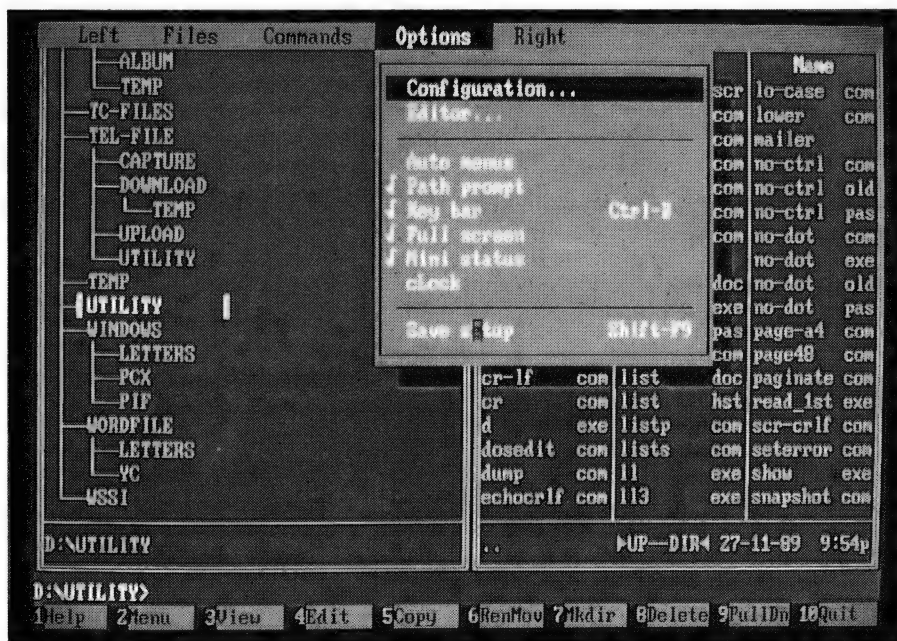
Norton Commander 3.0

NORTON COMMANDER comes with a simple installation program that takes care of all the details of loading it onto your system. Typing NC then loads the program, and the default screen appears. Taking up the right-hand side of the screen is a window containing three columns. In these are the names of any directories beneath the current directory, followed by the names of the files in the current directory, in each case, sorted in alphanumeric order. The bottom line of the screen has a series of labels for function keys F1 to F10, while the next line up shows what appears to be a Dos prompt.

To use Norton Commander to run a program, highlight the name of a file in the window. If it is a program file, with a .BAT, .EXE or .COM extension, then press Enter or double-click a mouse button. Any Dos command, or external program, can be run by typing the details in at the prompt just as if the Commander was not present. Either way, the Commander takes a mere 17K while an external program is running.

Files are manipulated via commands entered from the function keys or from an internal menu. There are a host of options. A second window can be popped-up beside the first. Either can show a list of file names (including file sizes, dates and times), or information on the disk, like its size, space used and free, or a tree of the directory structure of a disk. For EGA, 25 and 43 line modes are available, and 35 and 50 line modes for VGA. Screens can be configured for color, mono or laptop, automatic screen blanking with various intervals is available, and there are many other ways to configure the product to suit your own style of working.

Most useful are the user-defined menus. The user creates an ASCII file, using any editor, but preferable using the internal Norton Commander editor, and can define up to 40 items per menu. Each item has a title to appear in the menu dis-



Norton Commander 3.0 with the Options menu pulled down. Note the Function key labels across the bottom of the screen.

play, a hot-key to quickly invoke it while in a menu, and several lines of commands like the commands in a batch file to actually carry out the defined task. While menus can't be nested, there can be local menus as well as a main menu. When started, the Commander looks in the default directory for a file called NC.MNU. If it is found, it's used as the local menu. Otherwise, Norton Commander looks into the directory from which it was run for NC.MNU and uses this as the main menu.

Finally come Mail and Link, and the various file viewers. Commander Link allows two computer, typically a desktop and a laptop, to be connected via a null modem serial cable. One of these machines then becomes the master and the other the slave. The screen on the slave is frozen, while a file listing on the master shows the list of files in the default directory of the slave. Files can then be transferred from one to the other using exactly the same commands as would be used to transfer files from one disk or directory to another on the same machine. Speed is quite good, though a little slower than with LapLink or Brooklyn Bridge, with about 3000 characters per second being achieved, compared to around 6000 characters per second with the others. The Mail function allows users of the US MCI electronic mail system to easily handle all those tasks of sending and receiving messages. The file viewers can handle all the various dBase format files created by the various dBase versions or those like Clipper or FoxPro, plus R:Base, Reflex, Paradox and MS Works, wordprocessors like

Product Details

Product: Norton Commander 3.0

From: Peter Norton Computing

Distributor: PC Extras

86 George St,
Redfern 2016 NSW

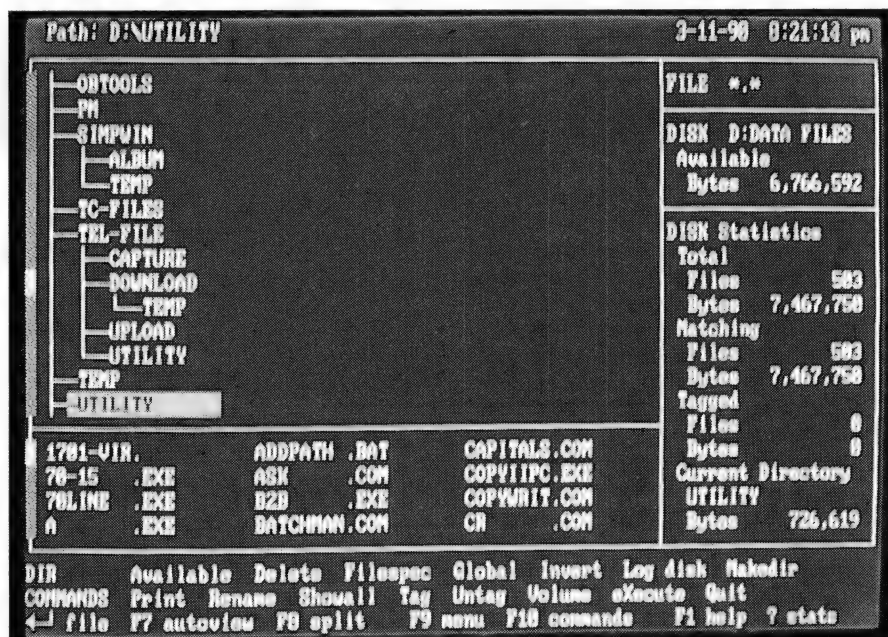
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XTreePro Gold's default display showing the 'tree' structure in the upper left window, a file list in the lower left, and statistics in the right column.

XTreePro Gold

LIKE NORTON Commander 3.0, installation of XTreePro Gold is automated with a program on the distribution disk, creating a new directory and loading all the appropriate files into it. Typing XTGOLD then starts the program.

Pressing Enter takes the cursor from the tree window to the window with the list of file names, and pressing it again makes the tree window disappear, and the list of file names grow to take its place. Pressing Enter again returns you to the first screen. The display can be split into two halves, side by side, with each having a tree window and files window, making it easy to see the contents of a source directory and a target directory when carrying out tasks like copy or move.

At the bottom of the screen is a list of commands, each with one letter capitalised. A command is selected by pressing the key matching the capitalised letter. A second series of commands are shown by pressing the Alt key, and a third by pressing the Ctrl key, with the Alt or Ctrl combinations generally having similar functions as a key on its own, but acting on multiple files with additional power or features.

With the cursor in the list of files, pressing A changes the files hidden, system, read-only or archive attributes. C copies the file to a new drive or directory, or to a

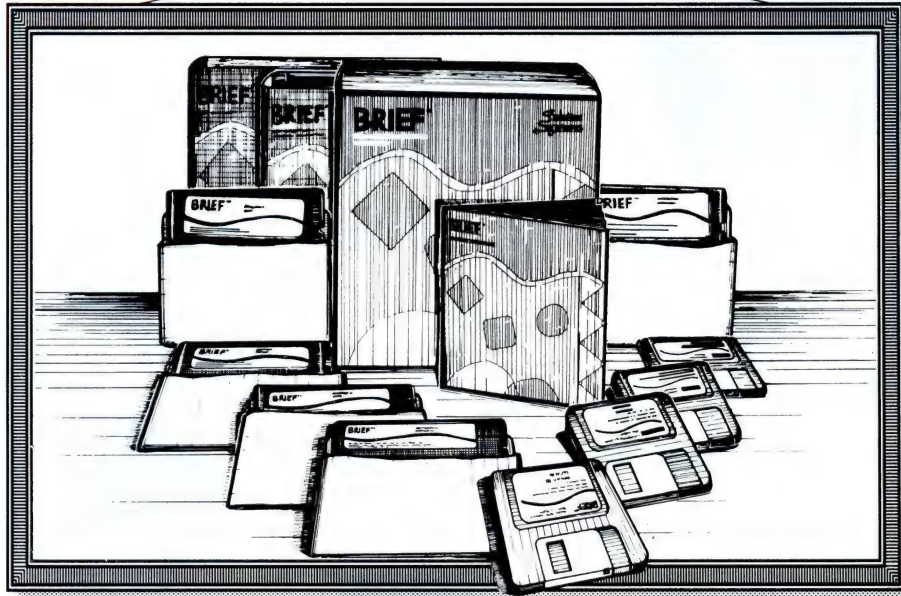
new name in the same directory. D deletes the file, E edits it, V views it, N (for a New date) changes the file date and time, O (for Open) runs a batch file associated with the extension of the current file, P prints, X (for eXecute) runs it. Several files can be tagged one at a time, for later processing as a group. By default, all files in the directory are shown, but by pressing F (for File spec) the user can define a subset to be shown, so that *.BAT will only show files with a .BAT extension. Pressing M moves files to a new directory on the same disk by rewriting the directory entry and not actually copying the file contents.

Pressing Ctrl-T tags all displayed files, and Ctrl-U untags them. And, with the ability to select which files are displayed, and also to tag or untag individual files. Once tagged, groups of files can be processed simultaneously. Pressing Ctrl-D deletes all tagged files, Ctrl-R renames them all, and Ctrl-C copies them all. Similarly, Alt and various keys have particular functions.

Changing drives is done by pressing L (for log) and the letter for the drive concerned. The other drives on the system remain logged, complete with all the details of each file in every directory. The display is then toggled from one drive to the next, or the next again, with the grey plus and minus keys. It's also possible, and very useful, to be able to see all files in all di-

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Timothy Lykes, Programmer



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Zortech C++	COBOL	mbp Visual COBOL
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Ryan-McFarland COBOL	dBase	dBFast
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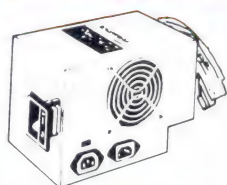
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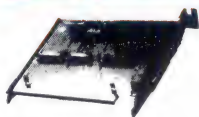
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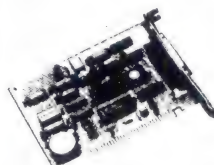
IBM* CARDS



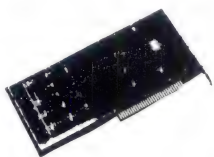
GAMES.....\$29
AT S/P GAMES.....\$59
4 WAY FDD CONT.
(360-1.44M).....\$129
2 WAY FDD CONT.
(360-1.44M).....\$80
CLOCK CARD.....\$39



VOICE MAIL.....\$245
PRINTER CARD.....\$29
EGA CARD.....\$169
2 WAY FDD CONT.
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RS232 SERIAL/
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RS232/ SERIAL/
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MONO/ COLOUR CARD.....\$96
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JOYSTICK FOR IBM*

Features selectable "spring centring" or "free floating". Electrical trim adjustments on both axis. 360 degree cursor control

C14205.....\$39.95

APPLE* COMPATIBLE

Ideal for games or word processing. Fits most 6502 "compatible" computers.

C14200.....\$39.95

APPLE* IIE & IIC SERIES COMPATIBLE

These joysticks have adaptor connectors to suit the Apple II, Iic, Iie and IIfx computers. Features include selectable "spring centring" or "free floating". Electrical trim adjustments on both axis, 360 cursor control and dual fire buttons.

C14201.....\$39.95



RITRON MULTISYNC VGA COLOUR MONITOR

Quality Auto VGA, EGA, CGA monitor without the excessive price tag!

Display Tube: 14 inch 90° deflection P22 Non-glare, tint. 0.13mm dot pitch
Active Display Area: 245 x 185mm
Resolution:
800 dots(H) x 600 lines(V)
Display Colour:
TTL input: 8/16/64 colours
Analog input: unlimited colours
X14528.....\$895



RITRON CGA COLOUR MONITORS

Quality monitors without the exorbitant price tag!

Display Tube: 14 inch 90° deflection 0.39mm Dots tri pitch. Dark face screen.
Phosphor: P22
Resolution: 640 dots (horizontal)
240 line (vertical)

X14526.....\$395



RITRON EGA COLOUR MONITORS

Display Tube: 14 inch 90° deflection dot type black matrix. Standard persistence phosphor.

Active Display Area:
240mm x 180mm
Resolution:
64 Colour: 720 dots(H) x 350 lines
16 Colour: 640 dots(H) x 200 lines
X14527.....\$595

COMPUTERS



IBM* XT* 640K RAM TURBO COMPATIBLE COMPUTER

* Check these features and our prices. We're sure you'll agree they're exceptional value for money!

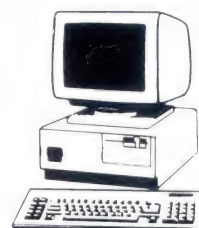
- Final assembling and testing in Australia!
- Fast TURBO Motherboard
- AT* style keyboard
- Tested by us for 24 hours prior to delivery!
- 8 Slot motherboard
- 12 months warranty!
- 150W power supply

640K RAM TURBO COMPATIBLE COMPUTER

2 x 360K Disk Drives, Multi-function Card, Colour Graphics, Disk Controller, 1 Serial, Parallel Port (Clock).....\$895

WITH 20 M/BYTE HARD DISK:
& single 360K Disk Drive...\$1,195
& dual 360K Disk Drives...\$1,395

WITH 40 M/BYTE HARD DISK:
& single 360K V.C. H.D.....\$1,575
& dual 360K V.C. H.D.....\$1,725



BABY AT* COMPATIBLE COMPUTER! 2M/B RAM \$1,695

- Final assembling and testing in Australia!
- 4 M/Byte Main Board, 2 M/Byte fitted
- Switchable 8/10/12 Mhz
- 1.2 M/Byte Floppy Disk Drive
- 80286 CPU
- Colour Graphics Display Card
- 8 Slots
- Floppy & Hard Disk Controller
- Printer Card and RS232
- Keyboard
- 200W Power Supply
- Manual
- 6 Months Warranty
- Size:
360(W) x 175(H) x 405(D)mm

With 20 M/Byte Hard Disk \$1,995
With 40 M/Byte V.C. H.D....\$2,195
With 80 M/Byte Hard Disk \$2,795

P.C ACCESSORIES



MONITOR EXTENSION LEAD

• 9 Pin D socket to 9 Pin D plug
P19032.....\$9.95



KEYBOARD EXTENSION LEAD

5 Pin Din plug and socket
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rie

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KEYBOARD SLIDE-AWAY

Slide your keyboard neatly away when not in use. Gives you more desk space. Securely holds any keyboard, wide or narrow.

C21083.....\$64.95



KEYBOARD STORAGE DRAWER

Stores keyboard under the PC or monitor conveniently out of the way. Fits PC/AT keyboard or 2 3/4"(H) x 22 1/4"(W) x 9 1/2"(D)

• YU - E21B
C21081.....\$84.75



MONITOR MOVER ARM

Position your monitor exactly where you want it! Place your monitor in an ideal working position, or out of your way when you're not using it. Maximise desk space!

- Solid steel structure
- Height adjustment by knob (3cm-27cm)
- Span 33cm
- Tray 30cm (tilting +/-15°)
- Desk clamp range 3cm-7.5cm
- Maximum load 50kg

C21079.....\$159



ENCLOSED PRINTER STAND

- Transparent cover makes it easy to check on paper supply
- Paper can be fed from the centre or the rear according to the design of the printer
- Removable drawer which allows paper to be changed without moving the printer
- Retractable rear basket makes print-out collection fast and convenient
- Suitable for most printers

C21055.....\$29.95

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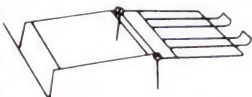
DUST COVER

Keep your computer and accessories free of dust and grime while not in use
XT* Cover Set

C21066.....\$14.95

AT* Cover Set

C21068.....\$16.95



PRINTER STAND

"AUSTRALIAN MADE"

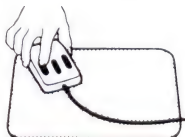
- Restores order to your work area
- Conveniently stacks paper printout in document tray automatically
- Made of plastic coated steel
- Suitable for most printers
- Excellent value at this price
- 80 COLUMN
- C21054.....\$24.95
- 132 COLUMN
- C21056.....\$34.95



DELUXE PRINTER STAND

- Restores order to your work area without occupying extra space
- Feeds and reloads paper under the printer automatically
- Adjustable paper deflectors to ensure smooth flow of paper
- Made of moulded plastic
- Suitable for most printers

C21058 80 column \$79.95



MOUSE MAT

- A quality mouse mat for accurate and comfortable tracking
- Anti-static
- 265 x 225mm

C21075.....\$9.95

"SUPER AMAZING SPECIAL" 3 1/2" DRIVE KIT

- JAPANESE 3.5" 1.44/ 1.2/ 720/ 360 drive
- 5 1/4" Mounting bracket
- Power supply adapter
- Floppy Disk controller card which controls 1.44/ 1.2/ 720/ 360/ drives
- Cable adapter

Complete instructions to install a 3.5" drive in your existing computer.

.....ONLY \$355

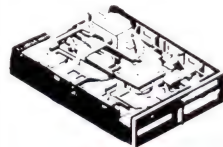


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Compatible with Apple 2+
Cat. X19901 Only \$179
FREE PACK OF S/S DISKS WITH EACH DRIVE!

APPLE* IIC COMPATIBLE DISK DRIVE

(including cable only \$189
FREE PACK OF S/S DISKS WITH EACH DRIVE!
(*Apple is a registered trade mark)



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5 1/4" 500K DRIVE

- 360K formatted.
- IBM* XT* compatible

Cat. C11901\$175

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- IBM* AT* compatible

Cat. C11906\$225

3 1/2" 1 M/BYTE DRIVE

- 720K formatted
- Double sided, double density
- 5 1/4" mounted

Cat. C11909\$269

3 1/2" 2 M/BYTE DRIVE

- 1.44 M/Byte formatted
- Double sided, double density
- 5 1/4" mounted

Cat. C11911\$299



20 M/BYTE HARD DISK

- Drive with controller card, IBM* compatible, 3 month warranty

X20010.....only \$499

40 M/BYTE VOICE COIL HARD DISK

- IBM* compatible, 28 msec access, 3 month warranty

Without controller...\$895

80 M/BYTE VOICE COIL HARD DISK

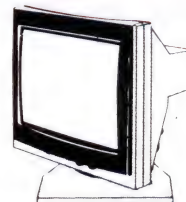
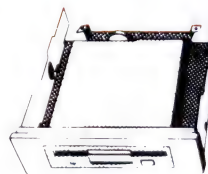
- IBM* compatible, 25 msec access, 3 month warranty

Without controller...\$1,495

330 M/BYTE VOICE COIL HARD DISK

- IBM* compatible, 18 msec access, ESDI, 3 month warranty

Without controller...\$2,995



VGA 14" COLOUR MONITOR

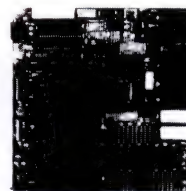
FEATURES:

- High resolution CRT.
- With tilt/swivel base.
- Used for VGA card.

SPECIFICATIONS:

- Picture tube:
 - a. Size and Deflection: 14 inch, 90 degree deflection
 - b. Dot Pitch : 0.31
 - c. Phosphor : P22
- Input Connector: 15p D-Type
- Input Singal:
 - a. Analog video Input
- Display Colours: 256, colours
- Video bandwidth: 40 MHz
- Resolution: 31 KHz: 720 x 480 (Max.) 35 KHz: 800 x 600/ 1024 x 768 (Max.)

X14530.....\$695



JUKO MINI XT 10MHZ MOTHERBOARD (NEST N3)

DIMENSIONS:

212X 217mm

SPECIFICATIONS:

- 8 bit high speed CPU either 8086 or V30
- 3 speed CPU selectable
- Support 8087 coprocessor
- Dynamic bus speed control
- 8 I/O slots
- 8 Interrupt channels
- 3 DMA channels
- Parity check enable/disable by jumper selection
- 10MHz 0 wait state memory access
- Memory configuration: 256K 4 DRAM (1 M/ 640K /512K on board)
- Parity check selectable
- Speed: 4.77/ 7.16/ 10MHz hardware/ Software selectable.

X18034.....\$169

ROD IRVING ELECTRONICS

rectories on a single disk in a single sorted file list, or to see all files in all directories on all logged drives in a similar single sorted list. Other features called Prune and Graft allow a subdirectory, and all its subsidiary directories and any files in them, to be cut off and thrown away, or moved to a different part of the tree.

XTreePro Gold has file viewers for ASCII (used for viewing files from most word-processors except DisplayWrite), HEX (for

program files), DBF (for database files using dBase file formats), and spreadsheet (for Lotus .WKS files). While viewing .DBF or .WKS files, a block of records can be marked and appended to an ASCII file.

Which to choose?

CHOOSING ONE or the other is not easy, and I find that I use both of them equally. But a choice has to be made, and it will depend on individual users and their working methods. Norton Commander enhances Dos, which is always immediately available, while XTreePro Gold hides Dos behind its own functions and commands. Users who often do major surgery on the file and directory structure of a disk will find XTreePro Gold invaluable. It's very quick and easy to use for these commands, and rather less convenient for the user who wants to run a program from inside it. Users happy to work at the Dos prompt, but needing significant and useful file and disk management, will choose Norton Commander. Any Dos command, or any command normally entered at the Dos prompt, can be entered at any time.

Running a program is as easy as putting the cursor on a file name and pressing Enter or double clicking the mouse, while other commands only need a press of a function key.

Both products have user-defined menus, with Norton Commander's being far better than that of XTreePro Gold, but both are quite simplistic, and users who need a better system should look elsewhere. The extra features like the electronic mail, the additional file browsers and communications features of Commander, or the better disk manipulation of XTreePro Gold, could be the deciding factors.

I have both products on my PC. As it boots up, my AUTOEXEC.BAT loads Norton Commander 3 and displays my user-defined menu with my favorite applications. Most tasks are then run from within Norton Commander 3. Even so, I often need one of the features of XTreePro Gold, particularly the Showall and Global functions, and then I run this stunning program. You should look at both, decide how you work, and then decide which one matches your personality. □

Product Details

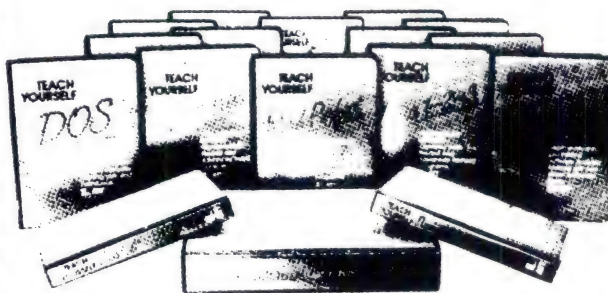
Product: XTreePro Gold
From: Executive Systems
Distributor: Software Wholesalers
8 West St,
North Sydney 2060 NSW
(02) 957 6686
Price: \$195 rrp.

Users who often do major surgery on the file and directory structure of a disk will find XTreePro Gold invaluable.

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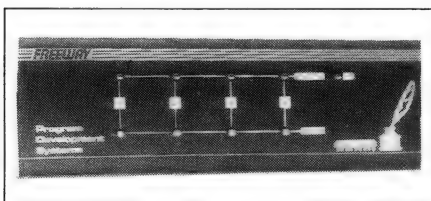
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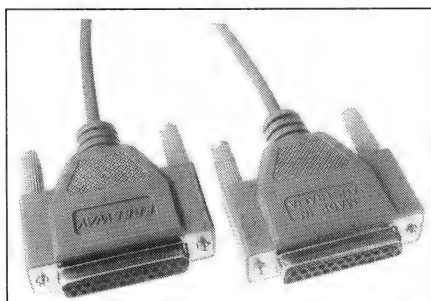
Connectivity means Power...

Freeway, from Program Development Systems, is a new LAN alternative designed to maximize your computer resources.

With a cable connected to your computer's serial port, Freeway's memory resident software allows other users to access your printer and hard disk *while you work*.



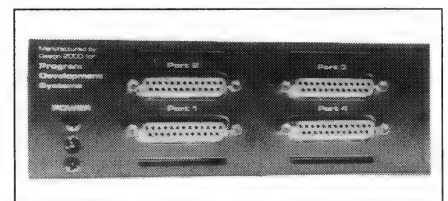
PC magazine (UK ed. Pg 64 June '89) said "...Freeway is the first file-transfer program with multitasking facilities. Its also the only program... which uses pop-up windows... Freeway lets you share a printer with a remote machine simply by popping up the Freeway window and selecting the printer option".



Your Computer Magazine (Pg. 24 Feb '90) said when awarding the Australian Hardware and Software Commendations "But the next product made our decision easy - it is commendable in both categories... Freeway offers an Australian networking solution for offices.."

Freeway has advanced features too, like security on disk access, and a message facility. Freeway can even duplicate your entire hard disk.

There are three models to meet your applications



Model	Computers	RRP
F2-Freeway	2	\$199.00
F4-Freeway	4	\$599.00
F6-Freeway	6	\$1050.00

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VIRUSES

THE AUSTRALIAN CONNECTION

THIS DECADE WILL see advances in computer technology, designed to add greater power and flexibility to computing. More PCs will find their way into small and medium sized businesses, and the home user will upgrade from the once popular PC XT to more powerful '286 and '386 systems.

This ever increasing size of the market leads to bigger demands for software, with the popular commercial packages heading the list. These more expensive software packages are too costly for most small business and home users, so the trend is to borrow a copy from a friend.

Computer consultants are on the increase, covering accounting, building, engineering, design and layout, you name it we now have a consultant for it. These consultants make full use of computers, modifying programs for their customers, designing machinery or buildings, then copying their work to disk so that their customers can see the results on their computers.

What we have just described is a complete network of computers, not physically connected by cables or modems, but connected by floppy disks. This network is the virus writer's main target, and is depended upon to infect as many PCs as possible before the bomb is triggered.

In Europe and the US, five new viruses are detected each month, with four of these five originating in Europe. The number of US-generated viruses is less than some European countries, but most viruses find their way into the US.

Viruses are at last being treated very seriously in many countries, with special

Computer viruses are becoming more and more common, and with the ever-increasing reliance on computers in business, the potential damage extends far beyond the computer system itself. Colin Keeble outlines some of the dangers and steps for prevention.

anti-virus associations being set up in an attempt to standardise software. IBM US have joined the fight, working closely with other companies to combat new viruses as they are detected

Protection

PROTECTION FROM computer viruses can take many forms, from packing your PC in a carton and sealing it, to installing a super hi-tech protection board. All anti-virus packages have pluses and minuses, and none can offer the ultimate in protection, although some do get close to it. Commercial packages which are widely used in the corporate fields are chosen

because they are commercial – that is, the feeling is that they are less likely to be infected themselves than public domain or Shareware packages. Most commercial anti-virus programs offer far more than prevention, with the likes of logging, recording, color menus and reports offered. Two top Shareware programs which we use are VirSCAN which can detect and identify some 60 known viruses, and VIRSTOP, which will prevent any of these from infecting the computer system. Registration with the authors amounts to a little over \$60 for the two, but that includes a full year's support and updates.

You do not need to use anti-virus software to get protection, although we strongly recommend that you do. Good housekeeping will reduce the risk of infection. The biggest enemy of all virus writers is a good backup routine, which should be part of your daily chore anyway. Four simple rules to follow are:

- 1) Check your system for viruses; if it's clean, do a complete backup – if not, kill the virus and then do a complete backup;
- 2) Backup your data daily;
- 3) Do a full backup monthly after checking for viruses; and
- 4) Allocate disks and tapes to each PC, never exchange between PCs.

Very few viruses can infect your data files, but most can infect your program files, so always keep your original programs write protected, and in a safe place so they can be re-installed in the event of an accident.

Most known viruses increase the size of the files they infect, in some cases by as

Side 0, Cylinder 0, Sector 1

```

134904D 53444F53 332E3300 02020100 02700000 02F00200 04E8D0S3.3.000.0p.0.0.
09000200 00000000 00000000 00000000 00000000 00000012 0.0.....t
00000000 0100FA33 C08ED0BC 007C1607 DD780036 C5371E56 ....0.34M.1.0x.6+7AU
1653BF2D 7CD90B00 FCAC2600 3D007403 260A05AA 8AC4E2F1 S+1d.4dG=.t000-c-f+
061F0947 02C7072D 7CFBCD13 7267A010 7C98F726 167C0306 +v060||+1d-Hrgab|ij=a-1v+
1C7C0306 0E7CA33F 7CA3377C DB2000F7 26117C8B 1E0E7C03 -100p1671671q .a4iAd10
C340F7F3 0106377C DB0005A1 3F7CE09F 00B00102 E0B30072 H+10+71q.4171d7.7000|.r
190BFDB9 0D00ED06 7DF3A675 0D0D7F20 DEE17DB9 0B00F3A6 i1j40.4p)3u10 4B)40.5=
7410BE77 7DE86A00 32E4CD16 5E1F0F04 8F4402CD 19BEC07D t1u)u1j.2E-^0A000=11j
E0EBA11C 0533D2F7 360B7CFE C0A23C7C A1377CA3 3D7C0B00 001-03p=601u4<1171u=1q.
07A1377C E04900A1 107C2A06 3B7C4038 063C7C73 03A03C7C +171E1.1f1u+;1000<10v0<1
50E04E00 5072C620 063C7C74 0C010637 7CF72600 7C03DB00 PAn.Xr|+0<100+71=001u+0
000A2E15 7C0A16FD 7DBB1E3D 7CEA0000 7000AC0A C07422B4 0.810-2)1a=10..p.4p1t+1
0EB00700 CD100BF2 33D2F736 107CFC2C 00163B7C 33D2F736 11q.→023p=611u+0.13p=6
1A7C0816 2A7CA339 7CC3B402 0D16397C B106D2E6 0A363B7C +10-1091|0i.91+0p06:1
0BCA86E9 8A16FD7D 8A362A7C CD13C30D 0A4E6F6E 2D537973 i400-2)06=11|10n-Sys
74656D20 6469736B 206F7220 6469736B 20657272 6F720D0A tem disk or disk error
5265706C 61636520 616E6420 73747269 6B652061 6E79206B Replace and strike any k
65792077 60656E20 72656164 790D0A00 0D0A4469 736B2042 ey when ready
6F67420 6661696C 7572650D 0A00494F 20202020 20205359 not failure
53405344 4F532020 20535953 00000000 00000000 00000000 SMDOS SYS.....
00000000 000055AA Press Enter to continue .....U-
1Help 2Lex 3Text 4Dir 5FAT 6Partn 7 8 9Undo 10QuitNU

```

Hex format

Offset 0, hex 0

9F007C00 001E5000 R+.L00...0.E.Gf.1...APG
D0A03F04 A0017503 0r1G+st0uN3A4a70L0u
BE0400B0 01020E07 0.Xv...0.SQR+UW.0.00n.
33C09C2E FF1E0900 0.03p17A0...Ao.SN3L...Ao.
057506AD 3B450274 Nuc05E3+0.0pN1:0u0i:E0t
00720FB0 010333DB 100p.0p0|0E...Ao.p+003
C333C00E D0FA0ED0 03p1...Ao.^ZYI|34+0
A1130418 48A31304 1JL.001N.00110+H000
064E00B9 B0010E1F 0A0A4017S.0L.10n.10n
1333C00E C0B00102 3+10s0n...r..-H34-00
00CD13ED 4990B903 1.C>0...t00.1C.-H01E
BE89010E 1FAC0AC0 1.0-Hr>0+10+0u00p0k0
0002B101 B00000CD t011q.→0s1p.100p.001C.-
AD3B4502 750B2EC6 11r11p.0p.1:0u11:E000.1

Hex format

Offset 430, hex 1AE

06000000 ZEFF2E11 002EC606 000002B0 0103B000 02B90700 0+....1.10p.0p0p.0p1
B00000CD 1372DF0E 1F0E07BE BE03BFBE 01B94202 F3A4B001 1C.-Hr>0+10+0u00p0k0
0333DBFE C1CD13ED C507596F 75722050 43206973 206E6F77 03p1-H0+Your PC is now
2053746F 6E656421 070D0A0A 004C4547 414C4953 45201041 Stoned!0p.LEGALISE 1A
52494A55 414E4121 00000000 00000000 00000000 00000000 RIJUANAI.....
00000000 00000000 00000000 00000000 00000000 00000000
00000000 00000000 00000000 00000000 00000000 00000000
00000000 00000000 Press Enter to continue
1Help 2Lex 3Text 4Dir 5FAT 6Partn 7 8 9Undo 10QuitNU

The Marijuana Virus lives in the boot sector, so it only infects a system if it is booted from an infected disk. To the right is an infected boot sector as seen by the Norton Utilities. A 'normal' boot sector is shown above.

little as 500K, so you can periodically check your programs if you know their original size. For example, you could set up a text file on your hard disk listing original programs sizes and check this each week.

When running new programs, boot the system from the A: drive, using a clean copy of your operating system disk with a write protect tab on the disk. Run the Dos Assign command and assign drive C: to A:, so if the new program attempts to write to your C: drive it will be diverted back to the A: drive.

Effects

THE EFFECTS of a computer virus can range from just a nuisance, to devastating, depending on which virus is encountered and how long it has been on the system. Let's look at two different cases we worked on here in Australia. The first infection was at a large manufacturing company employing over 600 people. Its high technology products included a large vol-

Run the Dos Assign command and assign drive C: to A:, so if the new program attempts to write to your C: drive it will be diverted back to the A: drive.

ume of inhouse developed software. They first became aware of a viral infection when one of their development PCs would not run an application that up to then had run without problems. A check of the program found it to be much larger in size than the original.

When called, we determined that they had the Israeli (Friday 13th) virus. We supplied the Unvirus program which removed the virus and restored their programs. We

also supplied a new detection program, which detected the Stoned virus on several of their PCs. We then supplied the Stoned Killer program which removed the virus from all but one of the infected PCs. This PC had probably been the first one to be infected and the virus had infected the Partition table and had started to work on the File Allocation Table (FAT), with the end result that many data files could have been lost. The company was lucky, because most of the files were recovered using various utilities.

In a second case, a small marketing company which relies on a very large database for their survival, the effects were potentially more dangerous. The database was set up by a 'friend' who charged for his services, but used a pirated copy of the database program. After three years in business, the company had built up a large customer base and the business could not run it without the database. Without warning, it stopped working — each time an attempt was made to run the program, it just locked up the computer.

Who ya gonna call?

EFFECTIVE PROTECTION against computer viruses is impossible to guarantee, but like the biological variety, there are steps that can be taken to minimise the risk. Existing disks can be checked for known viruses, and subsequent checks can look for any changes to executable files on the disk. Another form of protection involves installing a TSR to monitor calls to the disk drives, and warn the user of any potentially hazardous access calls, before they occur.

Virus Buster, from Leprechaun Software, offers all three types of protection, and they can be used either individually, or in combination. Upon introducing the program to a new system, one would typically run the Doctor module, which checks the disk for all known boot sector and program viruses. It also looks for EXE files with inconsistent header data – this would indicate that a virus has attached itself to the program. Doctor can also remove the viruses that it detects.

Viracide is the second module on the disk, and when it is first executed, it records a checksum of all program files on the disk. By default, this means COM and EXE files, and also program overlay (OVL) files. Other file specs can be added by the user.

Subsequent executions of this program, which would typically occur at boot time, checks each file against the previous record of that file, looking for any changes to the file contents of modification date. The only problem

with this is that some software's installation programs (such as WordStar and Virus Buster itself) modify the executable file itself, so that when the installation program is run to change the screen colours, for example, Viracide will flag the file as possibly infected when it is next run. This is not really a problem, but it is a potential source of false alarms.

The third level of protection is offered by Watchdog, a resident program which is installed in memory and intercepts programs being loaded into memory. The program to be loaded into memory is then checked against a previously stored checksum, and if they do not match, a warning message appears on the screen, and the user is prompted to choose a course of action, either to protect the file, disable protection, ignore the warning and continue, or abort the operation.

Virus Buster has quickly become one of the most-used pieces of software in the *Your Computer* offices, especially after our recent encounter with the Marijuana virus – see Jake Kennedy's editorial in the May issue.

Virus Buster was developed by Roger Thompson of Leprechaun Software in Brisbane; the company issues updates as new viruses and 'mutations' are identified. The package includes a well written, easy to follow manual which gives a thorough grounding in viruses, their prevention and cure. It's priced at \$165. Leprechaun can be reached on (07) 857 2686.

Viruses don't have to be installed – a system becomes infected when an infected floppy disk is run on it. After infection, it will infect other floppy disks which are run on that system, and these will infect other systems on which they are run. In no time at all, many systems can become infected, and unless PC users become aware of the dangers in running floppy disks copied from other PCs, the infections will continue to snowball.

Once a system is infected, any backup, or disk copied on that system will in turn become infected. The system will continue to operate – in some cases it could run slower than it normally would, or the available memory is smaller, or there may be other minor changes in the system. Not all changes to the system are caused by infection, but they should all be checked out by someone capable of determining the cause.

*In Europe and the US,
five new viruses are
detected each month,
with four of these five
originating in Europe.*

A system cannot become infected until an infected disk is run on that system. To reduce the risk of infection, take great care in which new programs you run on your PC. Sealed software has less chance of being infected than a copy of the same program from a friend. Even though packaged software has been known to contain viruses in a few cases, it is far safer than a copy from a friend, who may have got it from another friend, and so on. This copy could have been in contact with many PCs during its copying process, if it's infected, then your system will become infected.

Prevention is better than cure, there are many good detection programs on the market, check all new disks prior to running, never buy unpackaged software, especially from companies who are prepared to demonstrate the program you are buying on their PC.

The Computer Virus Clinic can be contacted at PO Box 975, Bankstown NSW 2200. An 'emergency hotline' operates on (02) 972 2697, or fax (02) 790 3882. □

The company did regular backups, so an attempt was made to restore from them. But, each time the program was run, it still locked the computer. As a last resort the original program was placed in the A: drive and it worked – until it too locked the computer.

Eventually, the Friday 13th virus was found. In most cases of this viral infection, the virus can be removed and the infected programs restored to their normal state. But, this particular database is one of the few programs in which part of the program gets overwritten and recovery is impossible. The company lost three year's work and nearly went out of business.

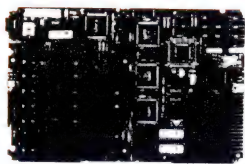
How they infect

COMPUTERS CAN be infected by a virus in many ways – the newest example is courtesy of the Aids Trojan. This is not a

true virus, and must be physically installed onto the computer to do any damage, but many people did just that. The Aids program is a seemingly useful program for those involved in the Human version of Aids and contains what appears to be very good background information.

The program has to be installed on a hard disk, using its own installation process. This is simple on the surface, but when you examine what it does, it is quite complex. Once installed, the program answers many questions on the Aids virus and appears to work as it should. After a pre-determined time, which is normally 90 boot ups, or re-boots, the program sets to work capturing all the hard disk's data, which it stores in hidden directories in a way that makes it impossible to recover the data without purchasing the registered copy from the author.

"NEW" 286 MOTHERBOARDS



THIS IS NOT
THE CORRECT PICTURE
AS THE PRODUCT IS SO NEW

12 MHZ 0 WAIT HALF SIZE AT

Description:

- 6.25 / 12.5MHz system clock speed
- 12MHz version- 80287-10 CPU
- Sockets for 80287 coprocessor
- Optional independent clock for 80287
- System speed hardware & software selectable
- Supports up to 1 MB DIP (8 x 44256 + 4 x 41256) or 4MB SIMM RAM Capacity
- 2 XT and 4 AT Compatible Expansion slots
- Real time clock/ calendar with rechargeable battery back-up
- Quadtel Legal bias
- Size: 8.75 x 8.75 inches

	Land mark	SI
Benchmark test	15.8	13

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- 2 XT and 4 AT Compatible Expansion slots
- Real time clock/ calendar with Rechargeable battery back up
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- Size: 8.75 x 8.75 inches
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	Landmark	SI
Benchmark test	20.8	17.6

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Includes 1 MB RAM with parity

X18320.....\$695

16 MHZ 0 WAIT HALF SIZE AT USING VLSI CHIPSET

- 8/ 16 MHz System clock speed
- 80286- 16 CPU
- 0/1 wait state RAM Access Selectable
- Sockets for 80287 coprocessor
- System speed hardware and software selectable
- Supports up to 1 MB DIP RAM (8x 44256 + 4 x 41256) or 4 MB SIMM RAM
- 2 XT and 4 AT Compatible Expansion slots
- Real time clock/ calendar with rechargeable battery back up
- On board power Good generator
- Size: 8.75 x 8.75 inches
- Legal BIOS

	Land mark	SI
Benchmark test	21.8	18

16MHz VLSI Motherboard without RAM

X18325.....\$395

Include 1 MB RAM with parity

X18330.....\$595

There are different merits for the two 16MHz motherboards. The 16MHz G2 motherboards support hardware EMS and later version will also support shadow RAM. The 16 MHz VLSI motherboard can only support software EMS and do not have shadow RAM, but it operates in true zero wait state. Unlike G2 or neat motherboard which operates under page mode, there is no need to adjust page sizes in order to attain maximum speed.

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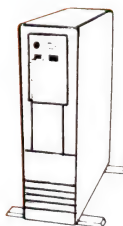
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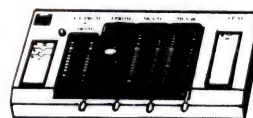
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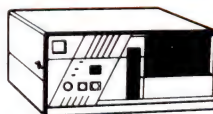
- Run all programs designed for the Roland MPU-401

architecture

- Socketed EPROM for easy user replacement
- 1/3 length (short) card will fit in any computer accepting standard expansion card, including laptops
- Including "Y" cable, external connector box to transport is unnecessary

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- Super high resolution: 200 D.P.I. (0.12mm/dot)
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- Optical rotary encoder

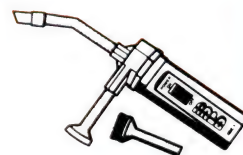
X19952.....\$89



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- Three buttons, user definable
- Silicone coated steel ball
- High resolution movement of 195 dots/inch. Smaller table space and less hand movement required
- Optical rotary encoder
- Max. tracking speed: 200m/sec
- Mouse resident firmware
- Size: 116 x 66 x 34mm
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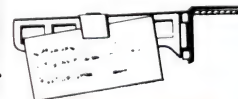
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System 3 HAS CHANGED ALL THAT!

The program consists of Debtors Ledger, Invoicing, Statements, Cashflow Controller and Inventory Controller. The system uses single entry accounting, whereby entering an item

into an invoice automatically decreases the stock quantity of that item, as well as adding the value of that item to the customers account. The Cashflow Controller can also extract the invoice value and add it to the Sales category for sales analysis.

Full report facilities are available, and the program can be set up for ANY printer, including lasers and daisy wheels.

System 3, as easy as falling off a log, but nowhere near as painful!

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SOUTH AUSTRALIA: Contact N.S.W. or Victoria Office

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TASMANIA: ESP Marketing, 52 Elphinstone Rd, Mt Stuart 2000 (002) 78 1606

NEW ZEALAND: Micro Dealer NZ Ltd., 60 Terakau Drive, Palupanga, Auckland. 274 0757

SHARK ATTACK!

TARONGA PARK ZOO launched its Australian Shark Attack File (ASAF) as part of a world-wide study into shark behavior, using a software program specifically designed for the task. The computer equipment was donated by two Australian computer companies.

Arche Technologies has donated an Arche 286-16 computer with a VGA high-resolution color monitor and 40Mb hard disk drive, while Interleave has donated an Accel-500 high speed color dot-matrix printer. The software chronicles all the known information on shark attacks in Australian waters, and links common factors in the attacks.

**Why do sharks attack?
No-one really knows, but
the experts are hoping the
Australian Shark Attack
File will help them
determine why.**

According to John West, Aquarium Supervisor at Taronga and supervisor of the study, sharks are commonly the victim of sensationalised media stories and public

paranoia. 'There is so much that we don't know about these much maligned creatures. For example, in the '60s and early '70s the Grey Nurse shark was all but killed out in Sydney's waters, and yet, there has never been any record of an unprovoked attack by a Grey Nurse shark. The Grey Nurse was recently made a protected species by law.'

West is now compiling information and says the ASAF should be fully completed this time next year.

Peter Rich of PR & MR Enterprises wrote the program, simply called the Shark Attack File, from scratch. 'It is a database system written in Clipper – a language compatible with dBase III but greatly extended beyond it and much faster than a dBase application.'

'It has 104 entry points for data, and some of these are coded so we can store the maximum amount of information. There is a huge amount of detail being stored so that no detail about a shark attack is missed.'

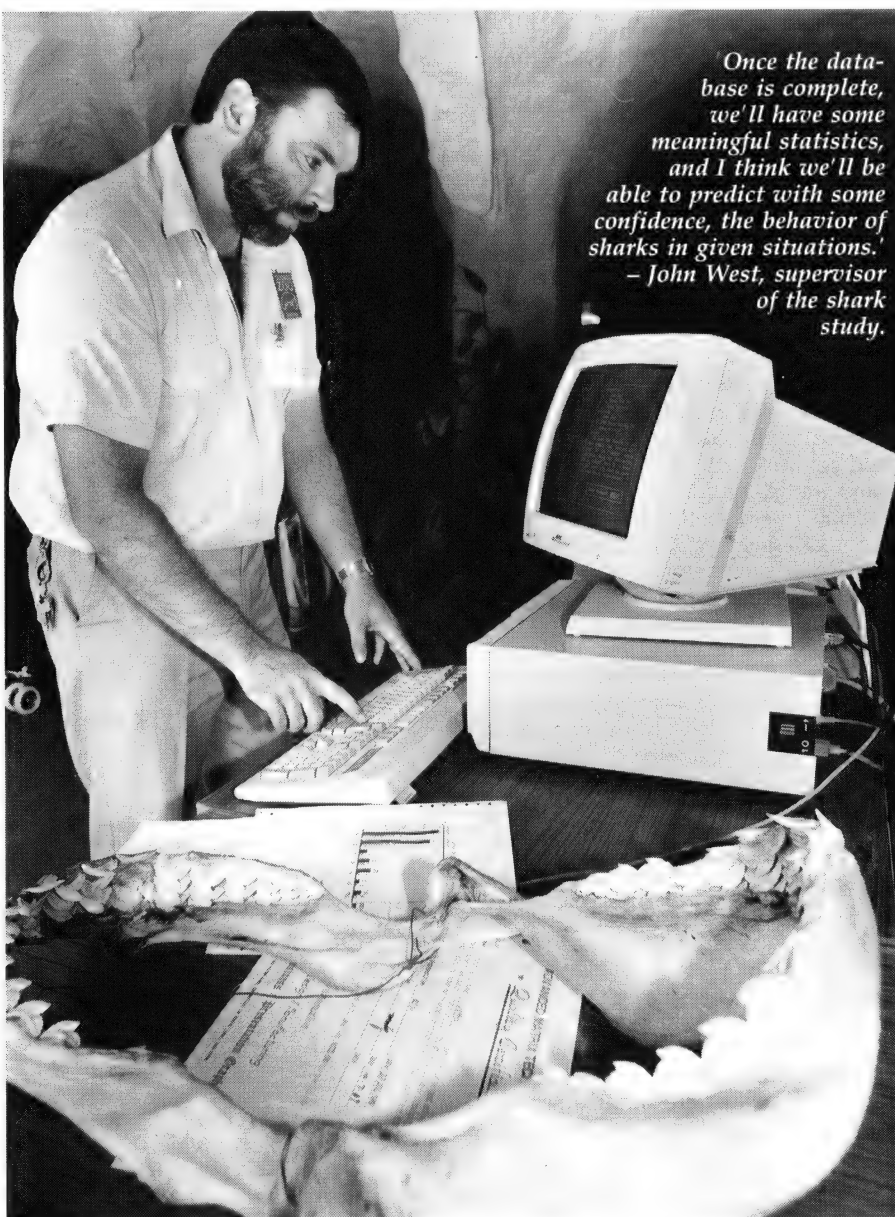
The program is broken up into three areas – the attack, the site and witness details. 'Details of the attack includes such things as the victim's clothing and accessories, injuries sustained and the direction from which the attack was made,' Rich said. 'The site includes latitude and longitude, water temperature, weather and distance from any channel. Details from the witness include any diversionary action taken and the effect.'

The program can write a report for the attacks where two factors were present so that some basis for the attacks can be established. 'At the moment we are still receiving information from people all around Australia who have been involved in a shark attack. I send out questionnaires to these people and we are steadily compiling all the data they give us,' West said.

The ASAF project is part of Taronga's Marine Biology program which is aimed at understanding and documenting the biology and behaviors of aquatic animals in captivity and in the wild.

West said the program would reach a peak next year when Taronga hosts a conference to examine all the conservation issues involved. Called 'Sharks Down Under' and scheduled for February 25 to March 1, 1991, the conference is expected to attract shark experts, naturalists and marine biologists from around the world.

'We will have planned excursions, including diving with a colony of sharks at Seal Rocks, and visits to various aquariums,' West said. □



'Once the database is complete, we'll have some meaningful statistics, and I think we'll be able to predict with some confidence, the behavior of sharks in given situations.'
– John West, supervisor of the shark study.

DRIVE IT!

IN JANUARY, we left you with a simple Menu set-up procedure and nothing to drive it with – like display menu bars, and so on. I will now remedy that little matter.

Before reading too much further, please realise that the code of Listings 1 and 2 requires *both* the MenuSetUp procedure published in *Your Computer*, January 1990, and the Windows code from September, 1989. The procedures, as shown here, are quite easily combined with the previous ones to produce a workable popup menu.

What we require in a popup menu is an ability to easily distinguish an item, by highlighting it in a different color, and a way of moving this highlight (menu bar), up or down the list of items. In the end, pressing Enter should throw us out of the menu and the program will then complete whatever other activity is necessary, as a result of the selection (for example, read a file). It is neat, and more professional in appearance, if we can highlight even static parts of a menu in different colors than the text, in a simple way, without continual calls to TextColor and TextBackground. For instance, the phrase Press Enter, where the Enter could be highlighted in red, or whatever.

How do we do it? If we are going to highlight a part of a menu, then we must have a way to change its foreground and background colors simultaneously. The procedure InvertItem shown in Listing 1 achieves this in a few lines of code. It uses direct memory access to store a series of attribute bytes, and hence, is quite fast in execution. Briefly, the procedure is passed through parameters which tell it where the upper left-hand corner of the menu window is, the window's width, and a Colors set as a hexadecimal byte. InvertItem then calculates the screen segment offset value C and uses the Mem array to store the byte Colors at successive screen attribute locations, thus –

```
Mem[ScrnStart : C+1] := Colours;
```

Remember that the C+1 is necessary because the attribute bytes are in the odd locations in the screen buffer. This is enclosed in a simple FOR...do loop. Let us examine the parameter Colors briefly, as

In January, Gary Jacobson gave us a simple menu set up procedure – now he adds 'popup' and highlight colors.

it, and values like it, appear several times in Listing 1. In Turbo Pascal, the screen foreground and background colors can be defined in the form –

\$Background Foreground

– where Background is a number between 0 and 8, and Foreground is a hexadecimal number between 0 and F. These numbers, and associated colors, are listed in the Turbo manual. For instance, if \$0F is stored directly in screen memory, a *black* background with *white* text will result for that byte. If the byte stored is \$70, we would get *black* text on a *light gray* background, and so on.

Moving on, we see that procedure ResetItem is of essentially similar layout, and with similar parameters, except for the Colors parameter, which is not needed. Turbo V5.0 and 5.5 have a pre-defined variable in the CRT unit called TextAttr, and if this has been set by the main program block (see Listing 2), it is only necessary to write this value back to those memory locations originally altered by InvertItem. So, we have some simple tools assembled, and we can now go onwards (and upwards?) to the main driving procedure.

Arrow keys

IN LISTING 1, the large procedure Drivelt implements access to the *up* and *down* arrow keys to move the highlight bar up and down the window. It also provides automatic wrap-around so that the bar does not crash into the top or bottom of the window and just sit there. Drivelt requires that you call it with parameters which give the upper left-hand corner of the window, the window width, the number of items, and the highlight Color set. If this seems too much, please visualise the insertion of

Drivelt as the last line in MenuSetUp. In such a case, all of these parameters (same names as in MenuSetUp) are passed through automatically. It's not bullet-proof programming technique, but a rather reasonable compromise.

```
program      MenuS;
Uses         Crt,Windows;

Var
  Ch          : char  ;
  i,j,k       : byte  ;
  LinePos     : byte;
  ScrnStart   : Word;
  MenuScreen1,MenuScreen2 : pointer;
  MenuString1 : String;
  MS1,MS2,MS3,MS4 : String;
  {-----}
  {  Start of procedure 'ColorChar'  }
  {-----}
procedure ColorChar(X1,Y1 : integer;
                   Colour : shortint);
Var
  C : integer;
Begin
  C := ((Y1-1) * 160) + ((X1-1)*2);
  Mem[ScrnStart:C+1] :=
    TextAttr or Colour ;
end;
{-----}
{  Start procedure 'ColorWord'  }
{-----}
procedure ColorWord(X1,Y1 : integer;
                   Len,Colour : shortint);
Var  i : byte;
Begin
  For i := X1 to (X1+Len) do
    ColorChar(i,Y1,Colour);
end;
{-----}
{  Start procedure 'InvertItem'  }
{-----}
procedure InvertItem(Width,X1,Y1 :
                   integer;
                   Colours : byte);
Var  i : byte;
      C : integer;
Begin
```

MENU

```

For i := (X1+1) to (X1 + Width+1) do
begin
  C := ((Y1-1)*160) + ((i - 1) * 2);
  Mem[ScrStart: C+1] := Colours;
end;
{ of procedure 'InvertItem' }
{-----}
{ Start of procedure 'ResetItem' }
{-----}
procedure ResetItem(Width,X1,Y1 :
                    integer);
Var
  i : byte;
  C : integer;
Begin
  For i := (X1+1) to (X1 + Width+1) do
  begin
    C := ((Y1 - 1) * 160) +
          ((i-1) * 2);
    Mem[ScrStart: C+1] := TextAttr;
  end;
  { of procedure 'ResetItem' }
  {-----}
  { Start of procedure 'DriveIt' }
  {-----}
  procedure DriveIt(X1,Y1 : integer;
                    Width,NumItems
                      : integer;
                    Colour : byte);
  Var
    Ch : char;
    Row : byte;
  Begin
    Row := LinePos;
    InvertItem(Width,X1,Y1+Row,Colour);
  Repeat
    Ch := ReadKey;
  Case Ch of
    #27 : begin
      RestoreScreen(MenuScreen1);
      Exit;
    end;
    #0 : begin
      Ch := ReadKey;
    end;
  Case Ch of
    #72 : begin
      ResetItem(Width,X1,Y1+Row);
      If Row < 2 then
      begin
        Row := NumItems;
        InvertItem(Width,X1,
                    Y1+Row,Colour);
      end
    end
  end
end;

```

```

else
begin
  Dec(Row);
  InvertItem(Width,X1,
              Y1+Row,Colour);
end;
end;
#80 : begin
  ResetItem(Width,X1,Y1+Row);
  If Row >= NumItems then
  begin
    Row := 1;
    InvertItem(Width,X1,
                Y1+Row,Colour);
  end
  else
  begin
    Inc(Row);
    InvertItem(Width,X1,
                Y1+Row,Colour);
  end;
end; { of Down Arrow action }
end; { of extended key case }
end;
Until Ch = #13;
end; { of 'DriveIt' }
{-----}
{ Start procedure MenuSetUp }
{-----}
procedure MenuSetUp(X1,Y1 : integer;
                    Header,MenuString : String;
                    Colours : byte);
Var
  i,j,k : integer;
  NumItems,Width : integer;
  Item : String[50];
  Ch : Char;
Begin
  TextAttr := Colours;
  { Calculate width of largest item }
  { and count number of items. }
  {-----}
  Width := 0;
  k := 0;
  NumItems := 0;
  For i := 1 to Length(MenuString) do
  begin
    If MenuString[i] = '/' then
    begin
      Inc(NumItems);
      If k > Width then
      begin

```

```

        Width := k ;
        k := 0;
      end
    else
      k := 0;
    end;
    Inc(k);
  end;
  {-----}
  { Prevent clash with bottom of screen }
  {-----}
  If Y1 + NumItems + 4 > 24 then
    Y1 := Y1 - ((Y1+NumItems+4) - 24);
  {-----}
  If Width < 20 then
    Width := 20;
  SaveScreen(MenuScreen1);
  Window(X1,Y1,X1+Width+2,Y1+NumItems+4);
  ClrScr;
  FrameWindow21;
  Item := '';
  GOTOXY(Width div 2 + 1 -
          length(Header) div 2,1);
  Write(Header);
  {-----}
  { Code to 'parse' the MenuString }
  {-----}
  i := 1;
  j := 2;
  Repeat
    Repeat
      If MenuString[i] <> '/' then
        Item := Item + MenuString[i];
        Inc(i);
      Until MenuString[i] = '/';
      GOTOXY(3,j);
      Write(Item);
      Item := '';
      Inc(j);
    Until i >= Length(MenuString);
    GOTOXY(2,NumItems+2);
    For i := 1 to Width+1 do
    begin
      Write(#196);
    end;
    GOTOXY(1,NumItems+2);
    Write(#195);
    GOTOXY(Width+3,NumItems+2);
    Write(#180);
    GOTOXY(3,NumItems+3);
    Write('Use ',#24#25,' to select. ');
    ColorChar(X1+6,Y1+NumItems+2,4);
    ColorChar(X1+7,Y1+NumItems+2,4);
  end
end;

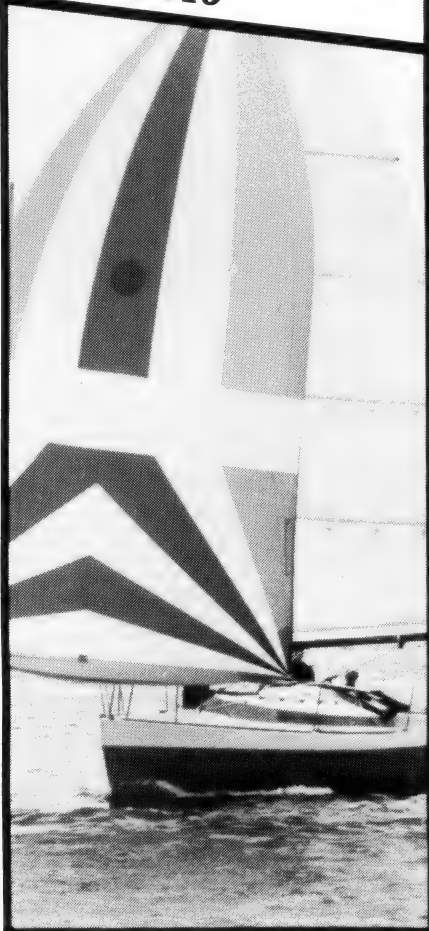
```


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MENU

```
GOTOXY(3,NumItems+4);
Write('Then press (Enter)');
ColorWord(X1+13,Y1+NumItems+3,7,4);
DriveIt(X1,Y1,Width,NumItems,$OF);
end; { of procedure 'MenuSetUp' }
{-----}
Begin
  ScrnStart := ScreenSegment;
  TextAttr := $1F;
  ClrScr;
  LinePos := 1;
  MS1 := 'Apostrophes/Commas/Full Stops';
  MS2 := '/Edit/Display/Semi-Colons';
  MS3 := '/Colons/Program Information/';
  MenuString1 := MS1+MS2+MS3;
  MenuSetUp(10,10,' Menu ',MenuString1,
  $70);
  Delay(1000);
end.
```

Listing 1. The code for a driving procedure that works in conjunction with MenuSetUp which was described in YC, January 1990.

As you can see, the arrow keys #72 (up), and #80 (down) are read in a nested case structure. Hitting a so-called extended key on the keyboard produces a #0 character first (and always), hence, in this case, we are guaranteed that the next code retrieved by ReadKey will be that of the extended key which was pressed. Pressing either key immediately resets the current item to normal text and background. Then it decrements (or increments) the Row of the menu it is on and calls InvertItem to highlight that row. If the Row is less than 2 or greater than NumItems, we have obviously run out of menu in the up or down direction, and Row is re-assigned appropriately (for example, if we run off the top, Row is re-assigned the value of NumItems, and the bar wraps to the last item in the menu). All of this is enclosed in a Repeat ... Until loop, and the exit condition is the pressing of the Enter key. The menu then disappears, and other things (in a real program), start to happen. In Listing 2, my short main program has a one second delay, and hence, does not disappear too quickly – for demonstration purposes only.

Two more procedures, so far not mentioned, are included in Listing 1, these are: ColorChar and ColorWord. These procedures take screen coordinates (X1,Y1), and a byte value (for example,

\$10) as parameters. The ColorChar procedure then performs a logical OR with this byte and the value of TextAttr, and stores the result at the attribute location associated with (X1,Y1). The procedure ColorWord needs a parameter, Len, to tell it how long the word is. However, apart from that, it is a simple FOR ... DO loop. Hence, to color a character or word such as Enter, we simply need to call one of these procedures with the appropriate parameters.

```
{-----}
Begin
  ScrnStart := ScreenSegment;
  TextAttr := $1F;
  ClrScr;
  LinePos := 1;
  MS1 := 'Apostrophes/Commas/Full Stops';
  MS2 := '/Edit/Display/Semi-Colons';
  MS3 := '/Colons/Program Information/';
  MenuString1 := MS1+MS2+MS3;
  MenuSetUp(10,10,' Menu ',
  MenuString1,$70);

  Delay(1000);
end.
```

Listing 2. An example of a main program 'body' using the MenuSetUp procedure described in YC January 1990, plus a few colors. Use it in conjunction with the code in Listing 1 to produce a working, popup menu.

Summing up

YOU WILL find this code is quite acceptable for implementing one menu, in isolation. Or, indeed, any set of menus where a single menu is displayed at a time. For sub-menus, or 'chained' menus, life is not so easy with this code. We would have to move into the treacherous depths of records, and 'chained' records, to implement multiple sub-menus, which is beyond the scope of this article.

Finally, those of us with memories that extend back to September last year will recall that we have now followed a neat implementation path, beginning with efficient memory usage for windows, and now applying those efforts to a practical user interfacing problem. Perhaps, in future issues we may be able to examine how pointers can be used to implement large data structures, albeit not involving windows. □

HANDS ON COMPUTING

Part 2

Tim Hartnell explores a utility for printing ASCII files in page format and a program debugging aid for long and complex Basic programs.

IN THE 'HANDS ON' series, we're exploring a number of worthwhile utility programs from the public domain which you can run on your IBM-compatible PC under GWBasic or BasicA. Entering and running the programs has two benefits. Firstly, you end up with a demonstration or utility program which is worthwhile in itself. Secondly, studying the listing (with the aid of the article) and attempting to understand the program logic, may well be of some help to you in developing better programming skills.

This month we're looking at a program which will print out an ASCII file in page format. This can be very useful for either printing out a program listing, or printing out a data file, without needing the program which created the data to be present.

Our Lister program jumps over the perforations between pages, and puts the date and a heading at the top of each page. As well as the date and heading, the program will print out the file name, remarks, and a page name, with 'continued' at the bottom of each page, and 'end' at the bottom of the final page.

Line 40 sets the page width, which is at 80 characters in the listing, and can easily be altered if you wish. The next line sets the number of lines to be printed per page. I've found that 50 is ideal if you're using American quarto paper. Try LP=56 if you're using A4, and then modify this if necessary.

Line 90 will remind you that the file you wish to list must be saved as an ASCII file. If you are saving a Basic program, in any

other Basic except Amstrad's Basic2, you need to specify that you want the file saved as ASCII (Basic2 does this automatically). To save a Basic program in ASCII, put A, after the file name. That is, in order to save a file called TIM, you'd type in SAVE 'TIM'.A and then press the Enter key.

The action really gets started in line 100 where you enter the file name in full, specifying the drive (d:) and the name (complete with extension).

Enter file name

NEXT, IN LINE 120, you're asked to enter a file name for the listing. This will appear at the centered at the top of each page of the printed output. A 'remark', which is printed in the top left-hand corner of each page, is entered in line 130. Then, in 140, you decide whether you want the printout to be to the screen or the printer.

From then on, the process is automatic. Get the program running in its present form, and then modify it as you wish. Add some color, perhaps the ability to halt printing at the end of each page until you press the Enter key, and so on. If you generally do not set the date correctly when you turn the computer on, you may wish to add an option near the start of the program to adjust the date. You could also modify line 290 so that the time was printed along with the date. Playing with the program in this way is interesting, and a good way of stretching your programming skills.

```
10 ' File Lister - Art Schneider, modified by Tim Hartnell
20 SCREEN 0,0,0:WIDTH 80:KEY OFF:CLS
30 DEFINT A-Z
40 WIDTH "lpt1:",80
50 LP = 50
60 '
70 PRINT "Your Computer File Listing Program"
80 PRINT:PRINT
90 PRINT "File you want to list must be saved in ASCII ( see
  "A OPTION' )"
100 COLOR 15,0 : INPUT "Full ASCII File Name  d:name.ext ";
    ASCIIFILE$
110 '
120 PRINT : INPUT "List heading file name.....";HEAD$
130 PRINT : INPUT "Short heading remark";REMLINE$
140 INPUT "2 = Screen  1 = printer  (1 or 2)";FF
150 ON FF GOTO 160,170
160 OPEN "lpt1:" FOR OUTPUT AS #FF :GOTO 180
170 OPEN "scrn:" FOR OUTPUT AS #FF
180 OPEN ASCIIFILE$ FOR INPUT AS #3
190 '
200 PAGE =0 : COLOR 7,0 : PRINT : TB = 5
210 PAGE = PAGE + 1 : GOSUB 290
220 '
230 K = K+1
240 IF K = LP THEN PRINT #FF, " " : PRINT #FF, TAB(30) "continued"
    CHR$(12):GOTO 210
250 LINE INPUT #3,A$
260 LA = LEN(A$) :IF LA > 80 THEN K= K+1 : IF LA > 160 THEN K = K +1
270 PRINT #FF, A$
280 IF EOF(3) THEN 310 ELSE 230
290 PRINT #FF, HEAD$ TAB(20) REMLINE$ TAB(60) DATE$ " page"
    PAGE
300 PRINT #FF, " ": PRINT #FF, " ":K=0 : RETURN
310 PRINT #FF, " "
320 PRINT #FF, " "
330 PRINT #FF, TAB(30) "end" CHR$(12)
340 CLOSE : END
```

Listing 1. Lister jumps over the perforations between pages, and puts the date and a heading at the top of each page. As well as the date and heading, the program will print out the file name, remarks, and a page name, with 'continued' at the bottom of each page, and 'end' at the bottom of the final page.

Debugging aid

IN LISTING 2 is the Clarity Program Debugging Aid – it's designed to assist you in debugging Basic programs. When you run Clarity, it asks for the name of another Basic program. This other program must have been saved, in advance, as an ASCII file. You save a Basic program as an ASCII file by putting ,A at the end of the save command as follows: **SAVE "NAME",A**.

```

10 REM CLARITY Program Debugging Aid
20 REM 'Hands On' - Your Computer
30 CLS:WIDTH 80:KEY OFF:SCREEN 0,0,0
40 DIM A$(500):N=1
50 INPUT "Enter name of file to be printed out ", NA$
60 OPEN NA$ FOR INPUT AS #1
70 A$(0)="":C=0:CLS
80 FALSE=0:TRUE=-1
90 FFLG=FALSE ' FINAL FLAG SET WHEN LASTRECORD READ
100 WHILE NOT FFLG
110 IF EOF(1) THEN 200
120 B$=INPUT$(1, #1)
130 IF B$=CHR$(13) AND LEN(A$(N))=0 THEN 190
140 IF B$=CHR$(13) THEN C=0: GOTO 240
150 IF B$=CHR$(34) THEN C=C+1 ' A"
160 IF B$=":" AND INT(C/2)=C/2 THEN
    A$(N)=A$(N)+B$:N=N+1:A$(N)="":C=0:GOTO 190
170 IF B$=CHR$(10) THEN 190'ELIM (LF)
180 A$(N)=A$(N)+B$
190 GOTO 110
200 N=N-1
210 CLOSE
220 FFLG=TRUE
230 REM ** INITIAL FORMATTING **
240 GOSUB 880:GOTO 660
250 REM A COLLECTION OF SUBROUTINES
260 REM REM-CHECK
270 BFLAG=0
280 EFLAG=0
290 IF MID$(Z$,7,3)("<rem" AND AFLG THEN EFLAG=1
    ' LAST STATEMENT WAS A REM
300 IF MID$(Z$,7,3)("<rem" THEN AFLG=FALSE:RETURN
310 IF MID$(Z$,11,1)("<" THEN Z$=LEFT$(Z$,9)+"
    +RIGHT$(Z$,LEN(Z$)-9) ' ADD A SPACE
320 IF NOT AFLG AND LEFT$(Z$,6)("<"
    THEN BFLAG=1 ' ?FIRST REM
330 AFLG=TRUE
340 IF BFLAG=1 THEN LPRINT
350 IF BFLAG=1 THEN LPRINT "*****
*****"
360 RETURN
370 REM IF-THEN CHECK AND PRINT
380 IF MID$(Z$,7,2)("<"IF" THEN RETURN
390 L$=Z$:FOR J=9 TO LEN(Z$)-3
400 IF MID$(Z$,J,4)="THEN" THEN 420
410 NEXT J

```

```

420 Z$=LEFT$(L$,J-1):GOSUB 540
430 LPRINT SPC(TB+6+3) "THEN"
440 Z$=" " +RIGHT$(L$,LEN(L$)-4-J) :GOSUB 540
450 IF MID$(L$,J+6,3)="FOR" OR MID$(L$,J+5,3)=
    "FOR" THEN TB=TB+3
460 RFLAG=1
470 RETURN
480 REM ** FOLD AND PRINT Z$ **
490 GOSUB 260
500 IF EFLAG=1 THEN LPRINT "-----
-----"
510 REM CHECK IF A REM
520 GOSUB 370:REM CHECK IF IF-THEN"
530 IF RFLAG=1 THEN RFLAG=0:RETURN
    'ONLY DO THEN PART ONCE
540 IF LEN(Z$)<79-TB THEN LPRINT LEFT$(Z$,6)
    SPC(TB) RIGHT$(Z$,LEN(Z$)-6):GOTO 630
550 LPRINT LEFT$(Z$,6) SPC(TB) MID$(Z$,7,79-TB-6)
560 X=80-TB
570 L=X+72-TB
580 IF L>LEN(Z$) THEN L=LEN(Z$)
590 LPRINT SPC(TB+6);
600 LPRINT MID$(Z$,L-X+1)
610 IF L=LEN(Z$) THEN 630
620 X=X+73-TB:GOTO 570
630 RETURN
640 REM *****
650 CLS
660 REM PAGE LIST
670 TB=0
680 REM ** INITIALIZE TAB **
690 CLS
700 FOR I=1 TO N
710 Z$=A$(I):GOSUB 480
720 REM CHECK FOR NEW TAB (FOR OR NEXT)
730 IF MID$(A$(I),7,3)="FOR" THEN TB=TB+3
740 IF MID$(A$(I+1),7,4)("<"NEXT" THEN 810
750 COUNT=1
760 FOR Q=5 TO LEN(A$(I+1))
770 IF MID$(A$(I+1),Q,1)=", " THEN COUNT=COUNT+1
780 NEXT Q
790 TB=TB-3*COUNT
800 PRINT A$(I)
810 A$(I)=" "
820 NEXT I
830 N=1
840 WEND
850 PRINT
860 LOCATE 24,1
870 END
880 REM INTIAL FORMATTING
890 REM LEFT JUSTIFIES LINE NUMBERS
    AND ALIGNS STATEMENT BEGINNINGS
900 FOR X=1 TO N

```

```

910 A=ASC(LEFT$(A$(X),1))-ASC("0")
920 IF A<0 OR A>9 THEN 1040
930 REM PROCESS WITH LINE #
940 J=1
950 A=ASC(MID$(A$(X),J,1))
960 IF (A>47 AND A<58) OR A=32 THEN J=J+1:
    GOTO 950
970 IF J>6 THEN 1080
980 REM MOVES STATEMENTS WITH SHORT
    LINE # OVER TO PLACE 8
990 FOR K=J TO 6
1000 A$(X)=LEFT$(A$(X),J-1)+" "+
    RIGHT$(A$(X),LEN(A$(X))-J+1)
1010 NEXT K
1020 GOTO 1080
1030 REM PROCESS W/O LINE #
1040 J=1
1050 A=ASC(MID$(A$(X),J,1))
1060 IF A=32 THEN J=J+1:GOTO 1050
1070 A$(X)=" "+RIGHT$(A$(X),LEN(A$(X))-J+1)
1080 NEXT X
1090 X=FRE(0)
1100 RETURN

```

Listing 2. *The Clarity Program Debugging Aid – it is particularly useful with complex programs since the program will print them out in such a way that errors can be quickly spotted, as can faults in logic.*

You need to have your printer turned on. Somewhat slowly, depending on the length and complexity of the file, Clarity will sort out the listing, and print it out on your paper so that you can see exactly how the program is constructed. In addition, REM statements will be preceded by a line of asterisks, and followed by a

line of dashes, which neatly divides up the program into sections.

Let's see how it works in practice. If, for example, your original program line read –

```
20 SCREEN 0,0,0:WIDTH 80:KEY OFF:CLS
```

Clarity would print it out as –

```

20      SCREEN 0,0,0:
        WIDTH 80:
        KEY OFF:
        CLS

```

This enables you to see exactly what is in the line. When you come to more complex lines, such as those containing IF/THENs, the value of the added clarity is immediately clear. Suppose the original line was –

```
260 LA=LEN(A$):IF LA>80 THEN K=K+1:IF LA>160 THEN K=K+1
```

Once Clarity had got to work, you'd see –

```

260      LA=LEN(A$):
        IF LA>80
        THEN
        K=K+1:
        IF LA>160
        THEN
        K=K+1

```

You can see how, with more complex lines, printing them out in this separate and indented way can quickly help you spot errors of logic, and help you work out how a program which was written by someone else works. □

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MORE BASIC BUILDING BLOCKS

In January, James Bowling described how the Define function in Basic could be used to translate commands from one dialect to another. Here, he further demonstrates the usefulness of Define . . .

FOLLOWING MY January article, we will present several additional pseudofunctions, which, while not pretending to reproduce existing Basic commands, nevertheless are very useful time and code saving techniques. The first of these makes easy the sorting of a series of records by date.

The pseudofunction FNDATVAL will convert a string such as 02/11/89 into the numeric 19891102. It has the added advantage of taking care of the century in the following way – if the decade is less than 50, then the next century is assumed; if the decade is more than 40, then the present century is used. Thus, the date 01/12/30 would become the numeric 20301201, while 01/12/80 becomes the numeric 19801201.

The sort should then be done on the key FNDATVAL(DATES), where DATES is the record date, in the form dd/mm/yy. Here is FNDATVAL (look out for the parentheses!) –

```
DEF FNDATVAL (A$)=  
  VAL(STR$( 19 + (SGN(51 - VAL(RIGHT$(A$, 2))))  
    + ABS(SGN(51 - VAL(RIGHT$(A$, 2))))/2)  
    + RIGHT$(A$, 2) + MID$(A$, 4, 2) + LEFT$(A$, 2))
```

Sometimes during a procedure we wish to place a lower limit of zero on a variable. That is, the variable may have any value from zero up, but must never reach a negative value. The conventional command to achieve this would be –

```
IF A < 0 THEN A = 0 ELSE A = A
```

However, by defining the following function –

```
DEF FNZ (A) = A * (SGN(A) + SGN(ABS(A))) / 2
```

– we can replace the above line with –

```
A = FNZ(A).
```

When we are between limits, a similar limit sequence is given by –

```
10 IF X < A THEN GOTO 100  
20 IF X >= A AND X < B THEN GOTO 200  
30 IF X >= B THEN GOTO 300
```

The corresponding pseudofunction is –

```
DEF FNX(X,A,B)= 1 + SGN(INT(X/A))+SGN(INT(X/B))
```

– and the usage –

```
ON FNX(X,A,B) GOTO 100,200,300
```

Often, it may be necessary to read a file or carry out a numbered sequence of commands in a circular way, that is, when the last number is reached, the count reverts to the first, and when counting backwards, on reaching the first, the count reverts to the last.

If MIN and MAX are the first and last respectively, and COUNT is the variable, then the Basic commands would be –

```
10 IF COUNT < MIN THEN COUNT = MAX  
20 IF COUNT > MAX THEN COUNT = MIN
```

The pseudofunction to replace this would be –

```
DEF FNCIRC (MIN, COUNT, MAX) =  
  .5 * (MAX + SGN(MIN - .1 - COUNT) * MAX)  
  + .5 * (COUNT * (SGN(MAX + .1 - COUNT)  
    - SGN(MIN - .1 - COUNT)))  
  + .5 * (SGN(COUNT - (MAX + .1)) + 1)
```

Then –

```
COUNT = FNCIRC(MIN,COUNT,MAX)
```

It is important to note that the values of MIN, MAX, and COUNT, being record numbers or line numbers, are, of necessity, integers. Values such as 3.5 would give incorrect results.

String operations

THIS FUNCTION is useful when you have the need to strip the high bit characters from a document produced by a wordprocessor, and replace them with the corresponding low bit characters –

```
DEF FNLB$(A$)=
  CHR$(ASC(A$)-(64*(SGN(ASC(A$)-127.5) + SGN(254.5 -
  ASC(A$))))))
```

Then, if T\$ is the string to be purged –

```
FOR X = 1 TO LEN(T$)
  MID$(T$,X,1) = FNLB$(MID$(T$,X,1))
NEXT X
```

Sometimes, when comparing keyboard input strings with strings read from files, we find that our program insists that 'Robinson' is not equal to 'Robinson', thus causing great mental anguish.

In actual fact, the probable reason for this is that while the keyboard input was 'Robinson', the string read from the file might be 'Robinson ', or perhaps even ' Robinson'.

The pseudofunction FNSTRIP\$(A\$) overcomes this problem by stripping all leading and trailing spaces, so that we can be sure that we are really comparing the 'flesh' of A\$ with the 'flesh' of B\$

```
DEF FNSTRIP$(A$) = RTRIM$(LTRIM$(A$)).
```

The cursor keys may be used in a program to move the cursor around the screen, to call up the next or previous record from a file, to jump from one menu item to another, and so on.

However, these keys are special cases in that they return a two-character string in which the first character is CHR\$(0), and their interpretation normally requires a sequence which first checks for the length of the string, and then if this is greater than one, reads the second character and proceeds from there, depending on the ASCII value of that second character. This requires a sequence similar to –

```
10 K$=INKEY$:IF K$="" THEN GOTO 10
20 IF LEN(K$) = 1 THEN GOTO 100:REM NON-CURSOR KEY
30 K = ASC(RIGHT$(K$,1))
40 IF K = 72 THEN GOTO 200:REM UP KEY
50 IF K = 80 THEN GOTO 300:REM DOWN KEY
ETC.. ETC..
```

The pseudofunction FNET(K\$) reduces the above sequence to –

```
10 K$ = INKEY$: IF K$ = "" THEN GOTO 10
20 ON (FNET(K$) + 1) MOD 7 GOTO 100, 200, 200, 300
100 REM NON-CURSOR KEY PRESSED
200 REM UP KEY PRESSED
300 REM DOWN KEY PRESSED
```

The pseudofunction is –

```
DEF FNET (A$) = SGN(LEN(A$) - 1) * ASC(RIGHT$(A$, 1))
```

– this returns zero for non-cursor keys, 72 for the UP key, and 80 for the DOWN key. Thus, the values returned by line 20 would be one, three, or four. The second value in the GOTO list is a dummy.

If we wish to expand the above sequence to include all the cursor keys, then line 20 should be –

```
20 ON FNZ (FNET(K$) - 70) + 1 GOTO 100,200,300,
  400,500,600,700,800,900,1000,1100,1200
```

Note here that we are using our FNZ pseudofunction which will not allow the value of FNET(K\$) to fall below zero, even when we subtract 70 from zero. Thus, the result of this combined pseudofunction is a value between one and 12, and the GOTO list carries on the program according to the following list –

KEY	PROGRAMME CONTINUES ON LINE:-
NON-CURSOR	100
HOME	200
UP	300
PGUP	400
LEFT	600
RIGHT	800
END	1000
DOWN	1100
PGDN	1200

The grey plus and minus keys and the centre key, produce the value zero, and hence are treated as non-cursor keys. It can be seen from the above that the values 500, 700, and 900 in the GOTO list are dummies.

Depending on your version of Basic, the DEF FN command may be limited to one statement, or may allow several statements within the DEF FN. The following DEF FN pseudofunctions take advantage of this multiple-line facility.

The pseudofunction FNSTRIP\$(A\$) given above uses the Basic commands RTRIM\$ and LTRIM\$ to delete the trailing and leading spaces from a string. If these commands are not available, then they may be replaced by FNRTRIM\$ and FNLTRIM\$ –

```
STRIP TRAILING SPACES
DEF FNRTRIM$ (A$)
  J = LEN(A$): WHILE MID$(A$, J, 1) = ' ': J = J - 1: WEND
  FNRTRIM$ = LEFT$(A$, J)
END DEF

STRIP LEADING SPACES
DEF FNLTRIM$ (A$)
  J = 1: WHILE MID$(A$, J, 1) = ' ': J = J + 1: WEND
  FNLTRIM$ = MID$(A$, J)
END DEF
```

Creating strings of characters

ANOTHER USEFUL Basic command is the STRING\$(A,B) command, of which SPACE\$(A) is a special case. STRING\$(A,B) produces a string of character number B, A characters long.

Gaps in Parts?

IF YOU MISSED James Bowling's 'Convert Your Basic', which was in our January issue, you've got a second chance: We'll forward photocopies of one to five parts of any Tutorial for \$4 including postage and handling, and six and over parts for \$8 (overseas postage additional). Please identify the Tutorial by its complete name, the issue it appeared in and the Part number (if applicable). All but the latest of our Tutorials are listed in YC's Annual Index, published with our July issue each year: refer to the Services page on how to obtain Back Issues.

Thus, the command "PRINT STRING\$(10,45)" will print the string "-----". SPACES(10) will produce a string of 10 spaces. The pseudofunction to reproduce this is -

```
DEF FNSTRING$ (A, B)
  ZZ$ = " ": FOR J = 1 TO A : ZZ$ = ZZ$ + CHR$(B):NEXT J
  FNSTRING$ = ZZ$
END DEF
```

The SPACES function may be duplicated by making the value of B in the FNSTRING\$ pseudofunction equal to 32.

The following pseudofunction also is quite useful. It counts the number of times the character YYS occurs in the string ZZ\$ -

```
DEF FNCOUNTCHR(ZZ$, YYS)
  C = 0
  FOR ZZ = 1 TO LEN(ZZ$)
    IF MID$(ZZ$, ZZ, 1) = YYS THEN C = C + 1
  NEXT ZZ
  FNCOUNTCHR = C
END DEF
```

Quite often we need to standardise the input of a date to the form 01/02/89, but our operators are prone to enter anything from 1-2-89 to 01.02.89 -

```
DEF FNFIXDATE$(D$)
  DIVIDER$ = "/-:."
  FOR X = 1 TO LEN(D$)
    IF INSTR(DIVIDER$, MID$(D$, X, 1)) > 0 THEN
      MID$(D$, X, 1) = "/"
    END IF
  NEXT X
  P1 = INSTR(D$, "/"): D1$ = MID$(D$, P1 + 1)
  Z$ = LEFT$(D$, P1): P2 = INSTR(D1$, "/")
  B$ = LEFT$(D1$, P2): C$ = MID$(D1$, P2 + 1)
  IF INSTR(Z$, "/") = 2 THEN Z$ = "0" + Z$
  IF INSTR(B$, "/") = 2 THEN B$ = "0" + B$
  FNFIXDATE$ = Z$ + B$ + C$
END DEF
```

The following pseudofunction FNDAY calculates the number of days from January 1st, 1940, to the date in question. It is useful for determining the number of days between two dates OOS\$ and PPS\$, where PPS\$ is the later of the two, thus -

```
Days between OOS$ and PPS$ = FNDAY(PPS$) - FNDAY(OOS$)
DEF FNDAY (DAT$) =
  REM INSURES CORRECT DATE FORMAT
  DAT$ = FNFIXDATE$(DAT$)
  REM SETS UP VARIOUS END-OF-MONTH DAYS
  REDIM X(12)
  X(1) = 31: X(2) = 59: X(3) = 90: X(4) = 120: X(5) = 151
  X(6) = 181: X(7) = 212: X(8) = 243: X(9) = 273
  X(10) = 304: X(11) = 334: X(0) = 0
  YEAR = VAL(RIGHT$(DAT$, 2))
  MONTH = VAL(MID$(DAT$, 4, 2))
  DAY = VAL(LEFT$(DAT$, 2))
  REM CALCULATES NUMBER OF LEAP YEARS
  LY = INT(((YEAR - 1) - 40) / 4) + 1
  REM DAYS FROM JAN 1 1940 TO JAN 1 THIS YEAR
  D = LY * 366 + ((YEAR - 40 - LY) * 365)
  REM ADDS DAYS TO END OF LAST MONTH
  D1 = D + X(MONTH-1)
  REM TAKES CARE OF EXTRA DAY IF THIS YEAR IS LEAP YEAR
  IF MONTH > 2 AND YEAR MOD 4 = 0 THEN D1 = D1 + 1
  REM FINALLY, ADDS THE DAYS IN THIS MONTH
  FNDAY = D1 + DAY
END DEF
```

This definition may be converted into a single-line function, but requires the prior setting up of a variable to carry the various end-of-month days. The one-line DEF FN is very complicated, but for the sake of those who are restricted to one-liners, here it is -

```
Y$ = "000031059090120151181212243273304334"
DEF FNDAY (D$, Y$) = (((INT((((VAL(RIGHT$(D$, 2))) - 1)
- 40) / 4) + 1) * 366 + (((VAL(RIGHT$(D$, 2))) - 40
- (INT((((VAL(RIGHT$(D$, 2))) - 1) - 40) / 4) + 1)) * 365))
+ (VAL(MID$(Y$, (3 * ((VAL(MID$(D$, 4, 2))) - 1) + 1), 3))))
+ (VAL(LEFT$(D$, 2)))
+ ABS((SGN((VAL(RIGHT$(D$, 2))) MOD 4)
+ SGN(2 - VAL(MID$(D$, 4, 2))) - 2) \ 3)
```

Note, also, that as this function involves two variables (D\$ and Y\$), both must be included in the pseudofunction title, and when defining and using.

From the above examples it is apparent that the DEF FN statement can be a powerful tool, not only in tailoring a Basic dialect to include non-existent functions, but also in expanding any version of Basic by creating special functions in line with the programmer's requirements. □

DAGS FOR WOOL

IN THE PAST 20 years, the selling of wool has been overrun by technology. Probably not before time, although one is a little sad at the passing of the wool buyer that we knew – the man (there may have been a lady wool buyer but I never saw her) in the white coat with a wealth of mystical knowledge at his fingertips who valued wool by sight and touch.

Today we measure our wool for sale. It is described by length, fibre diameter, its strength and location of the weak point in the length of the fibres. The difficulty with wool is that because it is not strips of plastic squeezed through little holes, but rather is an organically produced fibre grown by a living creature, it cannot be easily classified. The technology of measurement and the power of the modern computer has given us the ability to define the product parameters as well as some useful tools to help in processing the information generated.

The Australian Wool Corporation has

John Bailey discovered an economic way of woolclassing – Display and Analysis of Geocoded Statistics.

been collecting wool statistics since the inception of the floor price scheme. The data covers district of origin, yield of clean wool, length, diameter, and so on, up to 80 factors. Since 1986, this information has been made geographically compatible with the Australian Bureau of Statistics data via use of a standard Australian Geographic Classification which means that everyone doing demographic surveys uses the same boundaries. All of the wool industry data had been available in print form until CSIRO scientist John Ive de-

cided that we needed an item of software that could interrogate the massive database and give us answers to some of the questions that we might ask about the Australian wool clip.

The winter edition of *Rural Research* contains a comprehensive description of the software, its uses and origins. The software is still being developed, but currently provides map based representation of any wool production characteristics recorded. The software is called DAGS, which is an acronym for Display and Analysis of Geocoded Statistics. It could have been called DAMP for Display and Analysis of Mapped Parameters.

Australia has about 14 per cent of the world's sheep, but these sheep grow about 30 per cent of the world's wool. Our unique environment, and the skill and dedication of merino breeders, is the reason for this good performance.

Wool's new direction

NOWADAYS, THE MERINO breeder is turning more and more to objective measurement of the fibre and the flock. The computer is an essential tool in the analysis of flock data because of the great amount of information supplied. Breeders of all livestock are interested in body weight and the general appearance of their animals, but with sheep grown for wool, some important factors are not readily assessed outside a laboratory. With merino sheep, the average fibre diameter of their wool is an important factor in spinning the fibre, and the variation in fibre diameter is important in determining the quality of the cloth eventually produced.

It is not yet common for fleece measurement data to be transferred from the testing house to the flock owner on floppy disk, but it is quite possible and part of the service offered by Melden Laboratories. The cost of accurately measuring the fibre diameter of wool fibres in a sample has been greatly reduced, so I was tempted to take wool samples from my ewe hoggets and have them tested by



Melden Laboratories offer a range of tests for flock owners – it extends from a simple fibre diameter test to computing clean fleece weight, color appraisal, length and strength measurement, and an assessment of the breeding value of the sheep.

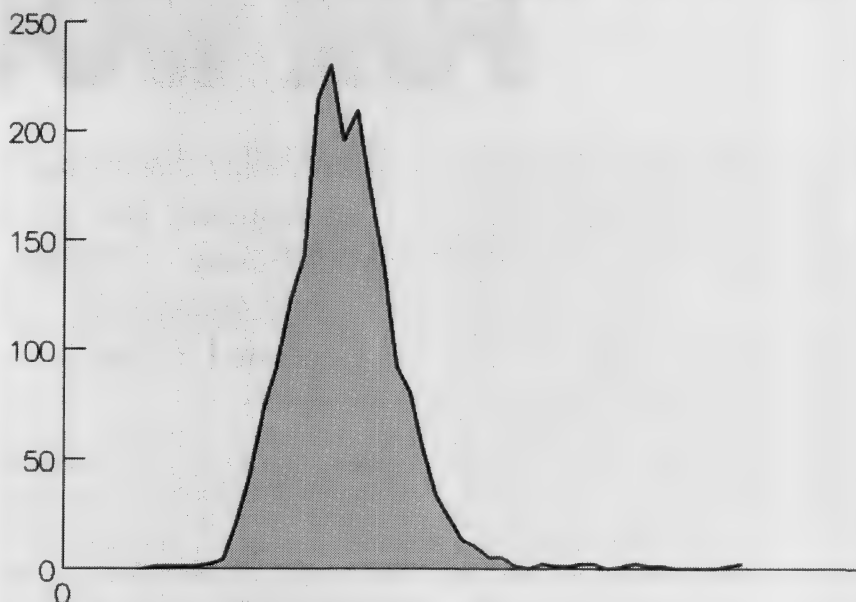
Melden in Fremantle for fibre diameter plus variation in diameter. A machine measures the diameter of 2000 fibres within each sample. The results of these tests are logged into a computer which works out the mean fibre diameter and draws a graph of the spread of diameters within the sample.

I began the testing process by bending over and shearing a mid-side sample of wool from each of 60 or so selected maiden ewes. The sample was placed in a bag and identified with the tag number of the ewe. These little bags of wool (about 50 grams each) were then sent to Melden for testing.

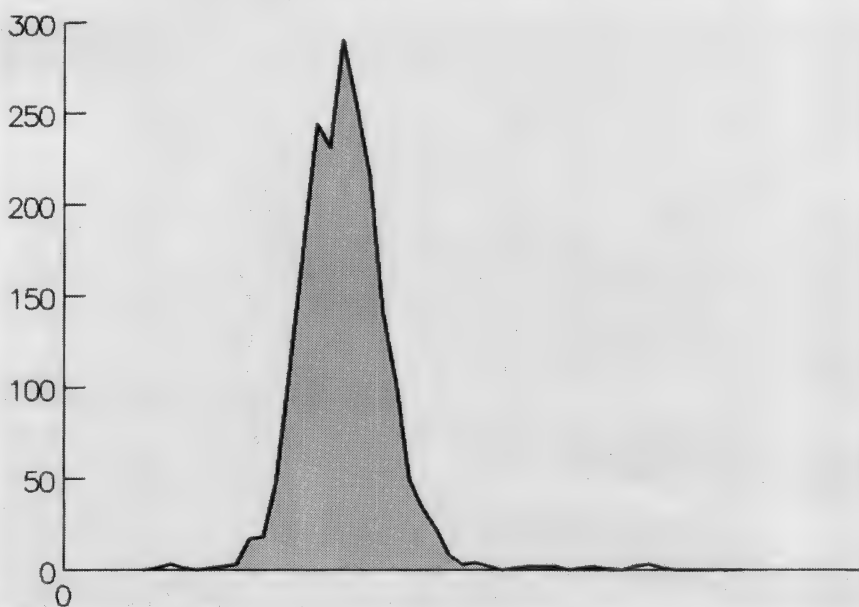
There is a range of test options available for flock owners. This extends from a simple fibre diameter test through to a comprehensive test involving computation of clean fleece weight, color appraisal, length and strength measurement, plus an assessment of the breeding value of an animal derived from this data. Naturally, the cost of a test rises with its complexity, and I opted for only fibre diameter and spread of fibre diameter. This test cost \$3.50 per head and the information was passed to me on a floppy disk as well as on 60 or so sheets of paper. The individual sheets of paper contained a graphic presentation of the spread of fibre diameter within the sample from each sheep. The spreadsheet on disk contained all the relevant data and the Standard deviation of each sample.

I found that the graphs were a much easier way of assessing the variation within the sample than trying to visualise and compare standard deviations. There is one trap with the histograms provided by Melden – the graphs are drawn by Lotus or a similar spreadsheet, and I guess the scale is set automatically so that the graph fills the page. This means that two similar looking graphs can be derived from very different results. The information supplied on disk consists of a spreadsheet (Lotus) of the average results, standard deviation, and co-efficient of variation of the results of the tests. The raw data is not included, although it is printed on the histogram sheets supplied for each animal. I entered some of this data manually into a spreadsheet and compiled a table of roughly 100 sheep's results. The resulting file came to about 60K so it would be possible to have all the data supplied on disk and draw one's own graphs. This is pretty laborious because most spreadsheets only allow about six data sets per graph, and with 60 sheep to look at, I am sure that I would rather have

Tag 49 Auto Scale.
SD = 4.35 Mean 21.1 m.



Tag 88 Auto Scale.
SD = 3.44 Mean 21.1 m.



There is a trap with the histograms supplied by Melden – because the software has been set up to fill the page, if the y-axis (number of fibres with the micron thickness along the x-axis) changes, the view becomes distorted.



Test results are supplied on disk in spreadsheet format and show the standard deviation of the 2000 fibres tested in each sample, but the hard copy of the graphs also supplied give an easier to interpret view of the samples.

the print-out from Melden and just be aware of the scale changes.

The on-disk information supplied by Melden includes macros to compute the various statistical analyses that you may require. The macros handle the data entry side of the spreadsheet as well as printing results, and it is worthwhile getting this service from Melden just to see these macros – it's a neat example of automatic spreadsheet manipulation. My main interest in this testing house was their willingness to provide data that could be plugged directly into a PC. Melden also provides fully accredited pre-sale testing services to international standards in competition with other wool testing laboratories, and claims to be using superior technology in some instances. Certainly the price is right, and I have been very satisfied with the presentation of results and the method used. The only problem you may strike is a delay – the demand for sale testing services is pushing the flock reporting service down the queue a bit. The best way to find out what goes on is to contact Melden Laboratories at all major wool selling centres and see what testing service best suits you. □

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MS

For more information about multiple sclerosis contact the MS Society in your state.



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Kevin Mclean describes how computers are keeping our roads on the level – and saving money!

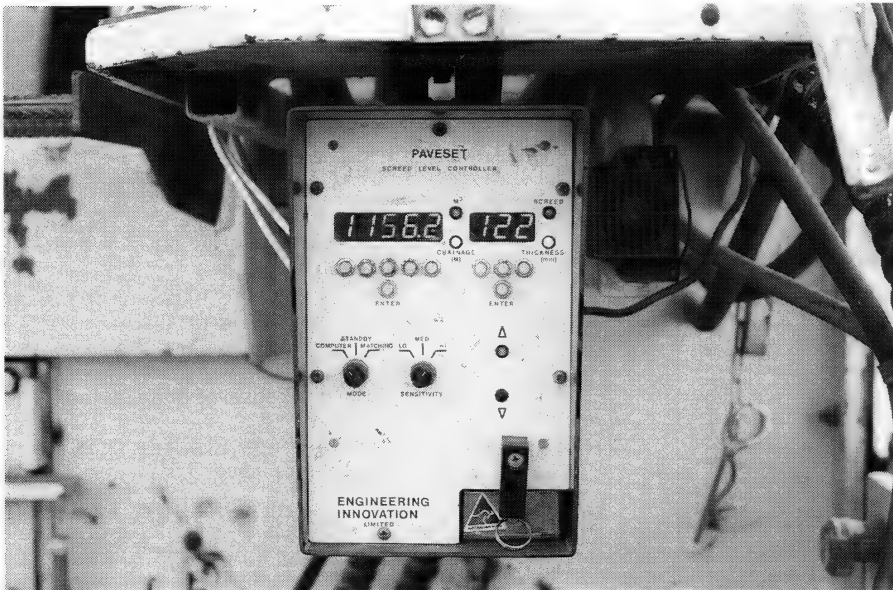
THE ROMANS WERE the first to figure out that paving roads (with stones) was more economical than letting traffic (chariots) dig into packed earth. In the 18th century, Scotland's Macadam then perfected the road base system which is still in use today. Basically, it uses coarse gravel in the foundation layers and finely crushed rock near the surface. This is then sealed by tar – this top layer is commonly referred to as 'bitumen'.

At first, gravel was laid by hand, but machines soon took over this role. Graders are still used to smooth out these pavement layers over the completed earthworks. British innovation saw the advent of specialised pavement spreaders. These monolithic machines were commonly referred to as paving machines and were similar in shape to a Sherman tank without the gun.

The general practice for road builders these days is to form the natural ground with cuts, fills, and so on, into the designed shape and then slap down the

pavement layers. It is imperative to get these pavement layers down as quickly as possible to minimise weather damage to the freshly laid gravel. These days, all roads are built to strict specifications and rain, wind, and sun can destroy most road-way tolerances in a short time.

Throughout the early '80s, road paving machines used a variety of methods to put the new gravel in place. The first and most important thing, was to get the raw earth formation as close as possible to the design height. Typical tolerances for modern roads are +15, -45 millimetres for earthworks or sub-grade. It follows that subsequent layers have tighter tolerances. Graders can do this job slowly. Pavers could not only lay the material, but were able to meet the strict tolerances required. Gravel is fed into the machines by tip truck through a front hopper system. Where tight level control was required, such as roads and airports, string lines were run out to guide the paver. Through an electronic sensor system the paver could lay the gravel at what ever depth the



Brisbane-based Roadset invented an on-board computer system that connects to the paving machine, the Paveset system. Collated level data is fed into small modules (DataSafes) via a laptop computer. Through a small wheel (which can be seen trailing the paver in the opening photograph) and other attached electronic sensors, the gravel can be laid to within 5 millimetres of design level.



string line dictated. Although accurate, string lines were time consuming and created problems for tip trucks.

Another method was to use a 'walking' beam which was eight metres long and contained dozens of small legs. This 'centipede' system really only averaged the eight metre length and struck real problems over sudden dips and turns.

By the early '80s, paving machine manufacturers had invented a crossfall device that took into account the crossfall of the road or formation. A dial up system allowed the paver operator to 'tell' the paver where the crossfall changes were,



and how much to alter them. However, manufacturers had still to tackle the level control of the machine.

Paveset

THE COLLECTION of level data to keep pavers on track by surveyors has always been time consuming. The data had to be compared to a design level and re-calculated to provide a string line height. A young Australian engineering surveyor named Colin Fleming looked for better and quicker ways of providing this data. For a start, he found programmable calcu-

lators halved the calculation time. By the mid '80s, Fleming's company, Roadset, had started using laptops to speed the operation up. 1988/89 saw the introduction of a fully computerised system which should make string lines a thing of the past.

Level data is still gathered by surveyors and fed into laptops. Specialised software is required to organise and collate it. Roadset (Brisbane), Engineering Innovations (Victoria), and the Main Roads Department (Queensland) have all spent considerable time and money developing software for this task. Roadset invented an

on-board computer system that connects to the paver, the Paveset system. Collated level data is fed into small silver modules via a computer. These modules are called DataSafes and plug straight into the paver's on-board computer.

Through a wheel and other attached electronic sensors the paver can lay the gravel to within 5 millimetres of design level. The guide wheel positions the paver horizontally and the Paveset computer reads the level data from the DataSafe to control the vertical position. Electronic sensors are used to transfer this information to the paver's hydraulic system. De-



The arrival of the new breed of laptops has heralded the streamlining of level data processing. Main Roads surveyors in Queensland, for example, can now provide road tolerance checks directly to the National Road Authority in Canberra, by way of floppy disks.



The Paveset system requires an MS-Dos machine. DataSafes (not pictured) are connected via cables, and leveling data is downloaded using specialised software which comes packaged with the system. Paveset costs around \$20,000 and is available from Engineering Innovations, 18-24 Moray St, South Melbourne 3205 Vic; (03) 690 9244.

spite the massive amount of hydraulic and electronic 'veins' required to keep the 'blood' flowing, these large, loud, vibrating machines still maintain accuracy. The crushed rock is delivered to the road sur-

face at walking pace. The removal of string lines has also cut tip truck times. At approximately \$1000 per hour for a full paving crew, any time saved is money in the bank. Using this computerised system,

layers of crushed rock can be placed very quickly. This has been a boon for road builders working in high traffic districts or wet, monsoonal areas. As soon as the pavement is down and rolled, traffic can be allowed over the new surface.

The arrival of the new breed of laptops has heralded the streamlining of level data processing. Main Roads surveyors in Queensland, for example, can now provide road tolerance checks directly to National Road Authorities in Canberra, by way of floppy disks. Modern day surveyors and engineers are finding laptops an invaluable tool. The day of the 'paperless' field worker may be approaching! Typical laptops used are twin floppy machines with 640K or 1000K. Communications and serial ports are a must, and a portable printer will invariably be needed.

At approximately \$1000 per hour for a full paving crew, any time saved is money in the bank.

Future trends

IN SEPTEMBER, 1989, Roadset embarked on an upgrade of the Paveset system. Modern road building and gravel laying techniques change rapidly, and better machinery is being manufactured to keep pace. In order to utilise the new pavers, the on-board Paveset computer has been upgraded, and floppy disks can now be loaded directly into it. It's also now capable of determining gravel volumes as well as controlling horizontal and vertical paver positions.

Those involved in the gravel transport industry can now be assured of a much more streamlined and equitable payment system. Road builders are pleased by any speed improvements, so the new system should suit their needs. In a country as vast as Australia, any improvement to our present road systems will save us dollars in the future (coastal roads cost approximately \$1,000,000 per half a kilometre). Australia leads the way with this new paver technology, perhaps with our current economic situation, it could prove to be one of our best exports yet. After all, every country in the world has roads, don't they? □

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PC MAINTENANCE

IF IT'S SIMPLE, IT GETS DONE!

YOU'VE JUST bought a new personal computer. Now plug it in and start thumping the keyboard? Wrong! Like any machine, a computer needs a certain amount of maintenance. Naturally, everyone can't be a computer technician, but there are certain things you can do to keep your machine in good condition.

As Bruce Iliff tells, your investment in PCs, software and accessories needs protective maintenance – and don't forget the most basic of computer maintenance: backups.



The integral component of most machines is the hard disk. If this fails then the entire machine can be virtually useless, regardless of whether it is a '386 running at 25MHz, or a simple XT compatible. There is little a user can do to care for the hard disk as it is completely sealed to keep out dust and dirt.

One thing you can do though, is to park the disk after every session. The read/write heads are micro-inches above the surface of the disk. Any bump can cause the heads to score across the surface, effectively ruining the disk. Parking the disk keeps these heads away from the data area, so if something happens while the machine is off, the disk won't get damaged. An example of what can happen is the computer desk collapsing – it's happened to me. As an outlandish example, if the office or home is burning down and the hard disk is parked, it can be picked up while making a

wild flee from the burning rubble! Some machines automatically park the disk when the power is off, while others require a utility, HDSIT or similar, to be run before switching off.

As the only moving parts in a personal computer, hard disks are prone to failure. If a hard disk has lasted five to seven years, it will be near the end of its life. After this, it would be wise to replace it, especially if it contains a lot of expensive data. And, with the rapidly evolving market, it's a good justification to update the entire system!

Naturally, keep a desk-bound machine on a desk. Laptops use a different type of disk drive which gives them rugged portability.

Floppy disks

WE ALL KNOW how to care for floppy disks – don't bend them, spear them with a chair leg, or staple labels to them. Storage is one way a lot of data gets lost. I heard about one fellow who kept his disks under his telephone. He always wondered why they were getting corrupted, and eventually, he was told that the magnet in the telephone bell scrambled the data.

If you have a lot of expensive data stored on floppies (backups for example), it might be worth buying a fire-proof safe for storage, as it could save a lot of heart-break.

Remember that small piece of cardboard in the floppy drive when you bought the machine? Well, that is to put in the drive to stop the twin heads bouncing together when you move the machine. It's not a complementary partition for your disk box!

Everything works well until Murphy comes along, or, until he spills coffee over your keyboard. If this happens, expect to buy a new one. If any liquid gets inside the main unit, turn it off immediately and take it to a repair technician, and don't forget your cheque book!

Keep Murphy and his damn cigarettes away from the machine. Smoke quickly infiltrates computers putting a coating on the pins of the ICs, the heads of floppy drives, and even on the print head of a dot matrix printer.

If the machine 'hangs up' or 'freezes' – as happens a lot with Murphy – and the big red switch is required to restart it, always wait at least five seconds before turning it back on. When a machine is turned off, some voltages take a while to dissipate. If they are still there when the power returns, spikes and other problems occur that could eventually damage cer-

tain components.

Hands up who's unplugged a peripheral cable while the machines at either end are turned on? We can get away with this a thousand times, then one day along will come Murphy, wanting to change printers. Problems will occur because you're effectively breaking an electric circuit. Voltage spikes can be generated because it is virtually impossible to pull the plug so all circuits break at once. This minor arcing and sparking can result in either machine having an internal rupture. If you have two printers, or two serial devices – a mouse and a modem – either put in another port or use a switch box which breaks all the circuits at once. These are quite cheap considering the problems they solve, and the cost of the equipment at either end.

Cleaning

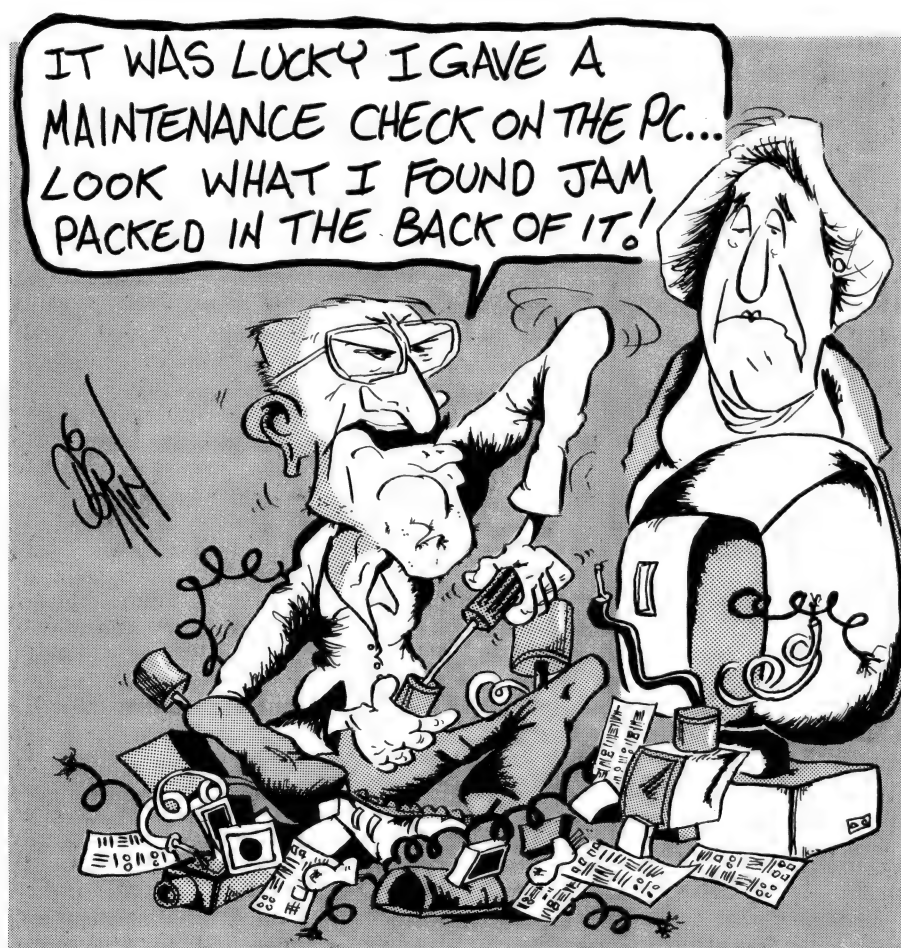
IT PAYS TO keep a computer clean as nothing looks worse than a dirty keyboard. Use a domestic type liquid cleaner, making sure you turn the unit off and never spray the cleaning solution on the keyboard – put it on a rag and wipe the keys.

Always keep your work area free of dust and dirt. Like smoke, dust can get into the main unit. Keep your dot matrix printer clean of that fine paper dust by occasionally using a vacuum cleaner with a narrow nozzle, as paper dust will eventually smudge the print head.

Floppy disk drives need cleaning too, and frequency depends on how much you use them. With a hard disk, the floppies don't get as much use, but with a twin floppy system, the heads can quickly accumulate dirt. A lot of this comes from the coating of the disks, and the only way to clean the heads is with a proper disk cleaning kit. But, make sure you follow the directions carefully or you could end up with more problems than you started with.

Software is what makes a PC run. It's no use having the fastest machine on the market with masses of storage and the clearest screen if you don't maintain your software in some order.

Throughout this article, I've talked about 'expensive data'. In many business situations, data is worth more than the machine. If a computer dies, it can be simply replaced, but if the data is lost, it's gone forever. If you have a lot of data accumulated over the years, work out how long it would take to punch in that information. A simple mailing list of a thousand names could take a typist an entire day, and a ten thousand item inventory could take a week, that is, if the data existed someplace beside the computer.



And, don't forget the time the machine will be without that mailing list or the orders that aren't being placed because the inventory doesn't exist. This is all money, so data is expensive!

A backup ritual is extremely important. There are infinite variations – using piles of disks, a streaming tape, or a dedicated machine just for a backup, even a combination. Whatever you chose, make sure it is done regularly. Once a month, every week, or whatever your particular situation demands – do it! (Too help you get started, the box item 'No excuses' describes a wide range of backup software and who to contact for more information.)

If using disks or tapes, a good system is to take a 'last resort' copy and store it away from the machine. You can store it in the local bank if the data is expensive, or take it home with you. Refresh it every six or twelve months, and then start a rotating system with three sets of backups, one taken every week. This is called a Grandfather-Father-Son backup. Each week you write over the Grandfather copy, which

then becomes the Son, and the Father becomes the new Grandfather. In this way, you will always have three sets of data, the oldest being three weeks. Then if the data on the hard disk gets corrupted and takes a week to notice, you might have backed-up the corrupt data last week, but you still have two backups containing good data.

Naturally, no backup system is infallible, and Murphy sees to that. So it is wise to regularly take hard copies of all data and store it off the premises. If Murphy does play havoc with your backups, it might only be a case of inputting the data again, and this could be better than starting with nothing.

For those on a budget, floppy disks are the most economical. You can use the Dos' Backup command, or get hold of a utility package to make the job easier. If you have a menu system, this is the place for any backup commands. It makes the job simpler, and if it's simple, it gets done!

Fastback is one of the better utilities for an IBM compatible, and the latest version costs a little under \$200. It has a wide

range of features depending on your particular use, and data compression can put about 500K on a 360K disk, and can verify the data after it is written. It generates history reports about the backup and stores them on the hard disk. Even if you lose this history report, it can generate another from the backup disks themselves. Macros can be written then accessed by a single Dos command.

Viruses

WE ALL KNOW about these. They can wreak more havoc than a spilt cup of coffee or death of a hard disk.

They are mainly propagated by floppy disks, though they can come through bulletin boards. Nearly all types, or strains, change COM and EXE files or attach onto the boot sector of disks. With the former, the virus is only initiated when the file is executed, then it wakes up and can wipe data, format hard disks and start propagating to other executable files. One way to stop the catastrophic affect of a virus is to only backup data files. There is no way a virus can attach onto these – yet! If you do find a virus on your hard disk, it's a simple matter of re-formatting, re-loading your legitimate software, and then your data.

Naturally, this only works if you are using software registered for your use. If you are using pirated software, the virus could be in the pirated copy. The only way around this is to buy legitimate software.

Be aware of what is going into the floppy drive or through a modem. Always buy software from legitimate suppliers and be wary of anything from Murphy down the street with the part-time public domain library. Get hold of a 'virus buster' or similar type of program (there are a few coming out on the market). Run this regularly to check the integrity of your system, and put it on the menu to ensure it gets done. Always be alert to what your machine is doing. If the floppy drive is accessed for no reason or if the computer is running slower, it would be worth checking for a virus.

A common way a virus spreads is through a business machine with a laser printer attached. Employees with home computers use the printer for the final copy of their personal letters. All it takes is one infected disk and it quickly spreads to numerous computers. If the business machine is cured, it can be infected again when Murphy comes along to print the final draft of a letter to Aunt Agnes.

Housekeeping on a computer means

No excuses

THERE IS NO excuse for not protecting the data on your hard and floppy disks. The hardware needs its own protection and maintenance, but, after all, hardware is replaceable, but much of your data won't be, or it will require a concerted investment in time and lost work to recover it.

The simplest form of backing up data is simply to make a copy of everything. That's fine as long as everything fits on one floppy – when it doesn't, the next step is to use one of the public domain compression programs. After that, backing up can start to be messy and time consuming – which means it will be done less and less. Like any 'security' procedure it needs to be simple, to be effective.

Even MS-Dos can be used to simplify backing up: check your Dos manual on the Backup and Restore commands. But, using Dos will only remain an effective method while the volume of data to be backed up doesn't occupy more than a few floppy disks. After that, the time involved and the inconvenience of swapping floppies starts to detract from the effectiveness.

For a system with only a single user, swapping floppies might still be the answer – it's a matter of balancing priorities. But, for larger systems, even with only two PCs, a backup procedure automated with software is the only method that will work consistently (it's a corollary of Murphy's Law, that the need for backups is directly proportional to the time since the last one was done). You will be entrusting the security of your data – and all of the investment that implies – to any backup software you undertake to use, so choose it carefully.

Try at least three different programs before deciding to ensure you feel comfortable with the way it works. Once it's installed, make sure that all operators understand why the software is there and appoint one user to oversee backup procedures.

Our survey of backup software showed most packages fall between \$100 and \$200 – that's a small investment to protect a lot of work. Some of the current offerings on the market include –

Back-it v3.1: \$185; from McQuarrie Management Services, ph: (02) 958 2945, fax: (02) 958 8671.

DS Backup+ v2: \$185; from Computer Equipment News (formerly Software Wholesalers), ph: (02) 957 6686, fax: (02) 957 2189.

Fastback Plus v2: \$329; from Programs Plus, ph: (08) 326 1313, fax: (08) 326 1644.

Intelligent Backup: \$242; from Imaginering, ph: (02) 697 8666, fax: (02) 697 8650.

PC-Fullbak+: \$179; from Portfolio, ph: (02) 487 2700, fax: 489 1265.

PC Tools Deluxe v5.5: \$149; from Vaporware, ph: (02) 725 3700, fax: (02) 604 1983.

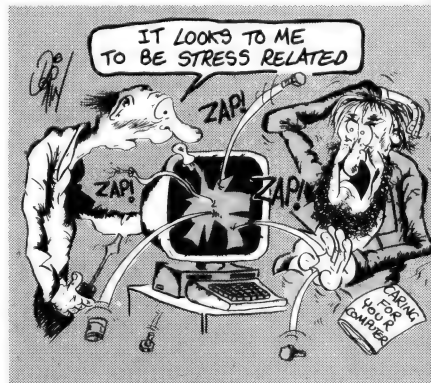
Sitback v2: \$169; from Logo Distribution, ph: (02) 819 6811, fax: (02) 819 6930.

Generally, you will find that the features offered with each package are reflected in the price. To give you an idea of what's available, it would be a worthwhile exercise to seek information on two or three different products listed above.

keeping things in a logical order. Arrange directories to keep track of files, regularly clean out unwanted files, and set up a menu system for easy and quick access.

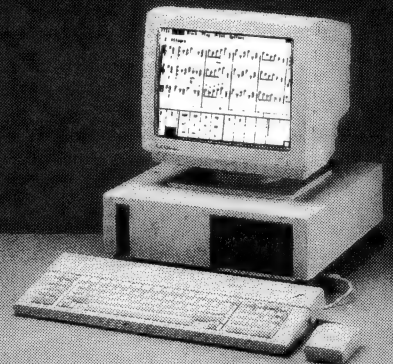
After a while, files on a hard disk get fragmented and are stored all over the disk. This can reduce disk access time and cause more wear on the heads. The way around this is to reformat the disk, or use a utility like Norton to tidy it. To keep the disk in the best working condition, it is worth formatting every six months. The magnetic coating on the disk naturally deteriorates and reformatting revitalises it.

All these maintenance jobs can keep your computer in good working order to help in those mundane tasks for what they were designed. But always remember that



no matter how much care and attention you take, Murphy is always there ready to strike! □

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RELEASE UPDATES



Desktop Machines

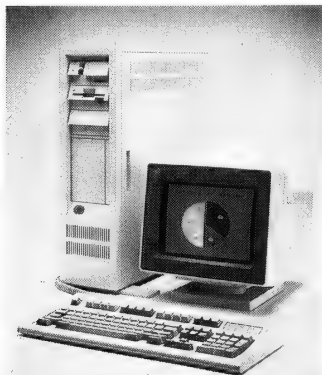
IBM Update

IBM Australia

Ph: (02) 634 9111;
Fax: (02) 680 4285

16MHz 80386SX PS/2 Model 65 SX

Std. RAM: 2Mb
Max. onboard RAM: 8Mb
Operating system: Dos 3.3 and 4.01, OS/2, or AIX
Hard drive: 23ms 60Mb SCSI (23ms 120Mb SCSI and 12.5ms 320Mb optional)
Disk cache: 64K
Bus: MCA
Floppy drive: 1 x 3.5-inch 1.44Mb
Serial ports: 2
Parallel ports: 1
Half-height devices: 2 internal; 2 external access
Other I/O: Optional internal CD-ROM drive
Expansion slots: 7 long free
Display: VGA
Keyboard: 101 keys
Warranty: 12-months
Price (rrp): \$9119



IBM Australia

Ph: (02) 634 9111;
Fax: (02) 680 4285

20MHz 80386 PS/2 Model 80

Std. RAM: 2Mb
Max. onboard RAM: 4Mb
Operating system: Dos 3.3 and 4.01, OS/2, or AIX
Hard drive: 23ms 120Mb SCSI (12.5ms 320Mb optional)
Disk cache: 64K
Bus: MCA
Floppy drive: 1 x 3.5-inch 1.44Mb
Serial ports: 2
Parallel ports: 1
Half-height devices: 2 internal; 2 external access
Other I/O: Optional internal CD-ROM drive
Expansion slots: Three 32-bit, four 16-bit (7 free)
Display: VGA
Keyboard: 101 keys
Warranty: 12-months
Price : \$19,740

IBM Australia

Ph: (02) 634 9111;
Fax: (02) 680 4285

25MHz 80386 PS/2 Model 80

Std. RAM: 2Mb
Max. onboard RAM: 8Mb
Operating system: Dos 3.3 and 4.01, OS/2, or AIX
Hard drive: 23ms 120Mb SCSI (12.5ms 320Mb optional)
Disk cache: 64K
Bus: MCA
Floppy drive: 1 x 3.5-inch 1.44Mb
Serial ports: 2
Parallel ports: 1
Half-height devices: 2 internal; 2 external access
Other I/O: Optional internal CD-ROM drive
Expansion slots: Four 32-bit, three 16-bit (7 free)
Display: VGA
Keyboard: 101 keys
Warranty: 12-months
Price (rrp): \$13,836

Atari Update

Atari Computers

Ph: (02) 805 0344;
Fax: (02) 887 2231

8MHz 80286 ABC286 AT

Std. RAM: 640K
Max. RAM: 4Mb

Operating system: Dos 3.3
Hard drive: Optional
Disk cache: No
Floppy drive: 1 x 3.5-inch 1.44Mb
Serial ports: 2
Parallel ports: 1
Half-height devices: 1 internal; 2 external access
Expansion slots: 3 short, 2 long (4 free)
Display: EGA
Keyboard: 101 keys
Warranty: 12-months
Price (rrp): \$1495 without monitor; \$2790 with color monitor and 30Mb hard disk

Everex Update



Australia Everex Systems

Ph: (02) 427 6111;
Fax: (02) 427 5948

6/12MHz V20 System 8802 XT

Std. RAM: 640K
Max. onboard RAM: 1Mb
Operating system: MS-Dos
Hard drive: Optional 20Mb
Disk cache: No
Floppy drive: 1 x 5.25-inch 1.2Mb
Serial ports: No
Parallel ports: No
Half-height devices: 4 external access
Expansion slots: 2 short, 3 long (5 free)
Display: Optional
Keyboard: 101 keys
Other: EMS 4.0 on motherboard; RAM disk manager and software printer spooler included
Warranty: 12-months
Price (rrp): \$1320; \$2472 with 28ms 20Mb hard drive and monochrome display (\$3480 with VGA); \$50 I/O card

AST Update



AST Research

Ph: (02) 906 2200;
Fax: (02) 906 2316

33MHz i486 Premium

Std. RAM: 4Mb
Max. onboard RAM:
Operating system: Dos 4.01
Hard drive: 28ms 10Mb
Disk cache: 8K
Floppy drive: 1 x 5.25-inch 360K
Serial ports: 2
Parallel ports: 1
Half-height devices: 2 internal; 3 external access
Expansion slots: 7 long
Display: Optional (monochrome EGA or VGA)
Keyboard: 101 keys
Other: 80387 fitted
Warranty: 12-months
Price (rrp): \$18,199 Base model

Olivetti Update



Olivetti Office

Ph: (02) 748 2600;
Fax: (02) 748 2734

25MHz 80386 M380/XP4

Std. RAM: 4Mb
Max. onboard RAM: 8Mb (RAM

expandable to 56Mb with cards)
Operating system: Dos 4.01 (OS/2, Unix V/386 and Xenix/386 optional)
Hard drive: 25ms 135Mb
Disk cache: 32K
Floppy drive: 1 x 3.5-inch 1.44Mb
Serial ports: 1
Parallel ports: 1
Half-height devices: 1 internal; 2 external access
Expansion slots: 2 short and 3 32-bit free
Display: VGA 12-inch monochrome (optional 14-inch color)
Keyboard: 101 keys
Other: Optional 80 and 125Mb streaming tape units
Warranty: 12-months
Price (rrp): \$14,187



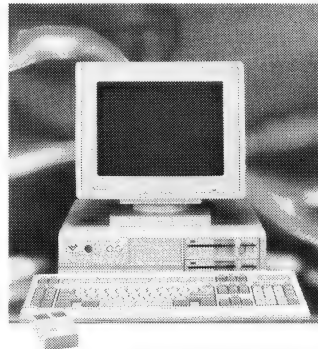
Olivetti Office

Ph: (02) 748 2600;
 Fax: (02) 748 2734

16MHz 80386SX M300

Std. RAM: 2Mb
Max. onboard RAM: 4Mb (16Mb with expansion cards)
Operating system: Dos 4.01
Hard drive: 25ms 40Mb
Disk cache: No
Floppy drive: 1 x 3.5-inch 1.44Mb
Serial ports: 1
Parallel ports: 1
Half-height devices: 1 internal; 2 external access
Expansion slots: 7 long in which 3 are in use
Display: VGA
Keyboard: 101 keys
Other: Optional
Warranty: 12-months
Price (rrp): \$7446

Sun Moon Star Update

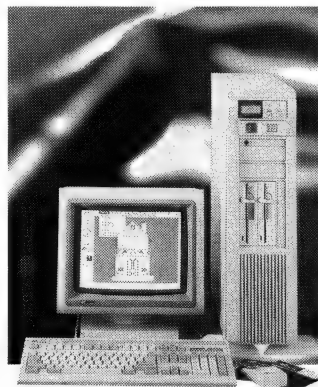


Sun Moon Star

Ph: (02) 317 3311;
 Fax: (02) 317 2233

4.77/10MHz 8088-1 SMS XT Premier

Std. RAM: 640K
Operating system: DR Dos 3.41; MS-Dos optional
Hard drive: optional 20Mb
Floppy drive: 1 x 5.25-inch 360K
Serial ports: 1
Parallel ports: 1
Half-height devices: 1 internal; 4 external access
Other I/O: Joystick
Expansion slots: One convertible slot, giving 3 short slots
Display: CGA/MGA
Keyboard: 101 keys
Warranty: 12-months
Price (rrp): \$1553 no hard disk; \$2065 with 20Mb hard disk



Sun Moon Star

Ph: (02) 317 3311;
 Fax: (02) 317 2233

20MHz 80386 SMS Professional

New releases?

WE ARE ALWAYS seeking new and interesting products to tell our readers about – we are particularly interested in releases that would be useful to small businesses, professional offices and 'standalone' users. Please address release information to: **Product Updates, Your Computer, PO Box 227, Waterloo 2017 NSW.** Preference will be given to those accompanied by suitable illustrations. For inclusion in a specific month, material must be submitted 6 weeks prior to the cover date. We are also interested in the stories behind new Australian product development – if there is a tale to your product that you would like to tell our readers, please contact Mark Cheeseman, Features Editor, on (02) 693 4143.

Std. RAM: 2Mb
Max. onboard RAM: 8Mb
Operating system: DR Dos 3.41; MS-Dos optional
Hard drive: 40Mb
Floppy drive: 1 x 5.25-inch 1.2Mb
Serial ports: 2
Parallel ports: 1
Half-height devices: 1 internal; 2 external access
Expansion slots: 3 short, 4 long, one 32-bit
Display: PGA; VGA optional
Keyboard: 101 keys
Warranty: 12-months
Price (rrp): \$5995 VGA; \$5950 EGA

Hard drive: 19ms 60Mb; optional no hard disk and 120Mb
Disk cache: N/S
Floppy drive: 1 x 5.25-inch 1.2Mb
Serial ports: 1
Parallel ports: 1
Half-height devices: 4 external access
Expansion slots: 4 long free
Display: VGA
Keyboard: 102 keys
Other: Proprietary software and configuration utilities; power-on and keyboard password security; 60Mb internal tape drive, \$1674; 120Mb internal tape drive, \$2010
Warranty: 12-months
Price (rrp): \$13,154; \$11,754 with no hard disk; \$14,554 with 120Mb hard disk

Compaq Update



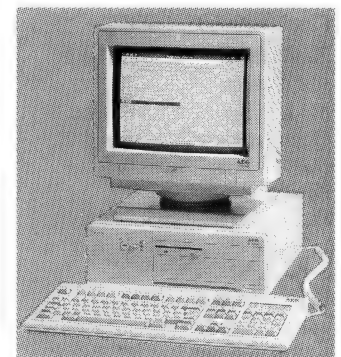
Compaq Australia

Ph: (02) 660 0077;
 Fax: (02) 660 3120

25MHz '386 Deskpro 386/25e

Std. RAM: 4Mb
Max. RAM: 16Mb
Operating system: Dos; OS/2 optional

AEG Olympia Update



AEG Olympia

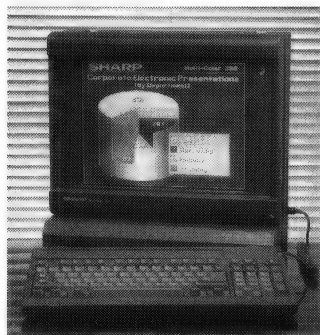
Ph: (02) 439 3444;
 Fax: (02) 439 7590

16MHz 80386SX Olystar 70

Std. RAM: 1Mb
Max. onboard RAM: 4Mb
Operating system: Dos 3.3; OS/2 optional
Hard drive: 28ms 40Mb
Disk cache: N/S
Floppy drive: 1 x 3.5-inch 1.44Mb
Serial ports: 2
Parallel ports: 1
Half-height devices: 1 internal; 2 external access
Expansion slots: 4 long (4 free)
Display: 14-inch VGA
Keyboard: 102 keys
Warranty: 12-months
Price (rrp): \$6685; \$8130 with VGA mono and 28ms 100Mb hard drive (\$8640 with VGA color)

Laptops & Portables

Sharp Update

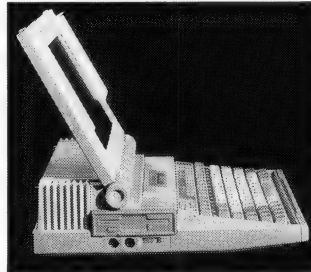


Sharp Corporation

Ph: (02) 831 9111;
Fax: (02) 831 1608
20MHz 80386 PC-8081
Std. RAM: 2Mb
Max. onboard RAM: 8Mb
Operating system: Dos 4.01
Hard drive: 19ms 80Mb
Disk cache: No
Floppy drive: 1 x 3.5-inch 1.44Mb
Serial ports: 1
Parallel ports: 1
Other I/O: Joystick
Expansion slots: 2 long free
Display: Color 14-inch VGA LCD
Keyboard: Detachable, 93 keys
Weight: 13.5kg

Power: Mains only
Warranty: 12-months
Price (rrp): \$15,950

Olivetti Update

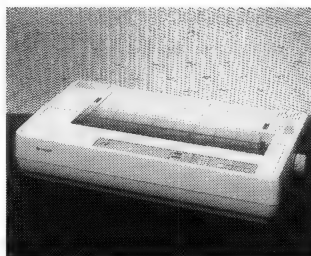


Olivetti Office

Ph: (02) 748 2600;
Fax: (02) 748 2734
16MHz 80386SX M316
Std. RAM: 1Mb
Max. RAM: 5Mb
Operating system: Choice of Dos 3.3 or 4.01, OS/2 or SCO Xenix V/386
Hard drive: 27ms 40Mb
Disk cache: No
Floppy drive: 1 x 3.5-inch 1.44Mb
Serial ports: 1
Parallel ports: 1
Expansion slots: 1 long
Display: Paper-white VGA, 640 x 480
Keyboard: 101 keys
Other: Mouse and carry case included
Weight: 6.8kg
Power: Mains/battery
Warranty: 12-months
Price (rrp): \$8041

Inkjet Printers

Sharp Update



Mitsui

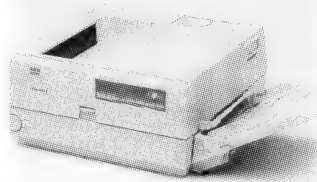
Ph: (02) 452 0452
Fax: (02) 452 0481

48-nozzle JX-730

Rated speed (10cpi): 140cps
Draft: 70cps NLQ
Printing method: Drop on demand
Rated noise (working): 50dBa
Ink colors: 4 (separate reservoirs)
Printing colors: 7
Carriage width: 15-inch
Dots/character: 18 x 24
Pitch: 10, 12, 18cpi
Resident typefaces: ASCII 96, graphic symbols
Graphics resolution: 180 x 180
Data buffer: N/S
Warranty: 12-months
Price (rrp): \$3495

Laser Printers

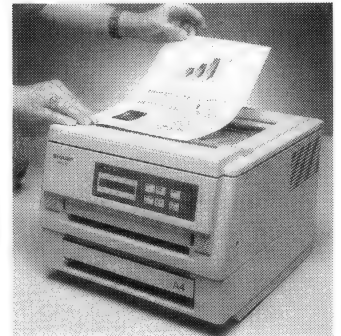
AEG Olympia Update



AEG Olympia

Ph: (02) 439 3444;
Fax: (02) 439 7590
6ppm Laserstar 6
Rated noise (working): 52dBa
Paper size: A4, A5, B5
Input/output trays: 150/150 sheets face down and 100 face up
Engine: Canon SX
Resolution: 300 x 300dpi
Resident typefaces: 9 internal fonts that can be printed in four directions on the same page and enlarged four times
PostScript: Optional
Other emulations: optional HPGL \$216; optional Epson and ProPrinter \$186
Data buffer: 1.5Mb
Buffer expandable to: 2Mb
Other: GKS vector graphics; a large range of font cards is available for \$350 each
Warranty: Not specified
Price (rrp): \$4380; \$7200 with 2Mb RAM and PostScript

Sharp Update



MGA

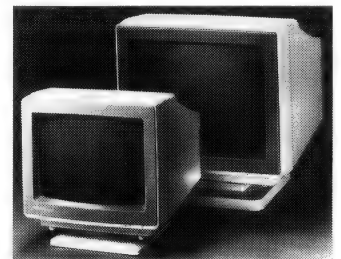
Ph: (02) 906 4499;
Fax: (02) 906 4727

6ppm Sharp JX-9500

Rated noise (working): 50dBa
Paper size: A4, B5, legal, envelopes
Input/output trays: 250/250 sheets
Resolution: 300 x 300dpi
PostScript: No
Other emulations: LaserJet II, Epson FX-80, IBM ProPrinter, Diablo 630
Data buffer: 512K
Buffer expandable to: 4.5Mb
Other: Two-way paper feed
Warranty: 12-months
Price (rrp): \$2795

Monitors

Electrohome Update



Thomas Electronics

Ph: (02) 53 0721;
Fax: (02) 534 2171

Color 19-inch Electrohome ECM1900

Compatibility: IBM
Graphics: CGA, MGA, EGA, PGA and VGA
Max. Resolution: 1024 x 512 non-interlaced; 1-24 x 800 interlaced

PRODUCT UPDATES

Screen type: Choice of clear polished, tinted or anti-glare
Horizontal frequency: 15 to 36KHz
Vertical frequency: 45 to 87Hz
Analog/TTL: Yes/Yes
Dot pitch: 0.31mm
Special card: No
Other: BNC loopthrough for connecting multiple monitors to the same analog source; choice of long or short persistence phosphors
Warranty: 12-months
Price: \$6958

Modems & Fax Cards

Xecom Update Energy Control

Ph: (07) 376 2955;
Fax: (07) 376 3286
2400bps XE24ZE4
Speed: 2400, 1200, 1200/75, 300bps full duplex
For: Zenith SuperSport range (models are also available for the NEC ProSpeed, Compaq LTEs, and the Toshiba T1600)
External/Internal: Internal
Auto-dial/-answer/-redial: Yes/Yes/Yes
Synchronous/Asynchronous: Yes/Yes
Encryption: No
Error correction: MNP Class 5
Software included: PC Mirror
Other: Call progress monitoring, DTMF tone generation
Warranty: 12-months
Price: \$760

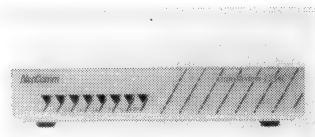
PureData Update



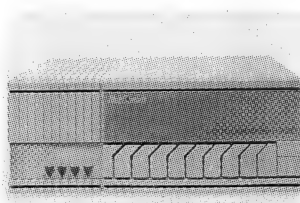
PowerTech International

Ph: (03) 348 1544;
Fax: (03) 348 1596
Combination fax/modem card PDI9624
Speed: 9600, 7200, 4800bps fax; 2400, 1200 modem
For: IBM and compatibles
Card length: Short (8-bit)
Group 3 compatible: Yes
Resolution modes: High and low
Auto-dial/-answer/-redial: Yes/Yes/Yes
Synchronous/Asynchronous: Asynch only
Encryption: No
Error correction: Fax Gp III only
Software included: Fax Manager software which includes a run-time version of MS Windows
Other: Automatic discrimination between fax and modem connections; network version includes Fax Supervisor
Warranty: 5 years
Price: \$1785; \$3110 network version

NetComm Update



NetComm Australia
Ph: (02) 888 5533;
Fax: (02) 805 0254
2400bps Smart- and Auto-Modem 1234E
Speed: 2400, 1200, 1200/75, 300bps full duplex
For: IBM and compatibles
External/Internal: External
Auto-dial/-answer/-redial: Yes/Yes/Yes
Synchronous/Asynchronous: AutoModem asynch. only; SmartModem both
Encryption: No
Error correction: MNP Class 4
Software included: NetComm Program v3.15
Warranty: 2 years
Price: \$999 SmartModem 1234E; \$799 AutoModem 1234E



NetComm Australia

Ph: (02) 888 5533;
Fax: (02) 805 0254
X.32 2400 and 9600bps PacketModems
Speed: 2400bps PacketModem 2400; 9600bps PacketModem 9600 – both full duplex; in asynchronous mode both support 300, 1200 and 2400bps full duplex
For: IBM and compatibles
External/Internal: Both available
Auto-dial/-answer/-redial: Yes/Yes/Yes
Synchronous/Asynchronous: Both
Encryption: Optional
Error correction: MNP Class 4
Other: Packet assembly/dissassembly capability
Warranty: 2 years
Price: from \$1599
 PacketModem 2400; from \$2999 PacketModem 9600

Software Updates

PC Tools Deluxe v6 PC Extras

Ph: (02) 319 2155
Fax: (02) 698 9926
Price: \$245
 \$65 Upgrade from v5.5

Central Point Software is now shipping a new version of its utility package, PC Tools Deluxe. There are over 30 enhancements, including Diskfix, a diagnostic and repair utility for corrupted or damaged disks. Other new features are Appended Backup for adding new files to an archive, a Dos command line, facsimile board support and a customisable user interface. The package has also had over 20 new file viewers added and Traveling Software's LapLink is now included.

SPSS for the Mac

SPSS Australasia
Ph: (02) 954 5660
Fax: (02) 954 5616
Price: \$1495 Base system
 \$580 Modules


Now available for Macintosh computers, SPSS is a full-featured data analysis package which includes sophisticated data and file management facilities. This new release incorporates features from both the Dos and mainframe versions of the package. There are more than 50 statistical functions included in addition to a programming language for creating custom routines or macros and a report writing facility. System requirements are a Mac with 2Mb or RAM (4Mb is recommended), a 20Mb hard disk, System 6.0 and Finder 4.2 (a maths co-processor is also

Chessmaster 2100

Mindscape
Ph: (02) 899 2277
Fax: (02) 899 2348
Price: \$69.95 IBM only

From the developers of the first chess program to be master-rated by the US Chess Federation, this new release of Chessmaster has unlimited levels of play, a teach mode and a 'Watch the Chessmaster think' mode. The package includes 110 classic games with on-screen commentary, a 150,000-move library of opening moves and both on-screen and book-based tutorials. There is now a War Room feature that facilitates viewing move lists, captured pieces, clocks and other features. The software also has the ability to replay a saved game with the computer analysing it. The original version of the game, Chessmaster 2000, won the US Software Publishers Association's Best Entertainment Program in 1988.

NetComm Program v3.15



NetComm
 Ph: (02) 888 5533
 Fax: (02) 805 0254
 Price: \$150
 \$50 upgrade from v3.0
 (Bundled with all NetComm modems)

The latest release of NetComm's communications program provides a wide range of features for accessing videotex and text data services, particularly Telecom's Discovery – switch mode capabilities have been included for interfacing between the Discovery 80 (formerly Dialcom) and Discovery 40 (formerly Viatel). A built-in WordStar-like text editor is now included, as is encryption capability. A programming package, C2L, is supplied for those wishing to develop their own communications interfaces. Other new features include a file utility menu and improved support for all major file transfer protocols.

recommended). SPSS Advanced Statistics, SPSS Tables and SPSS Trends are available as add-on modules.

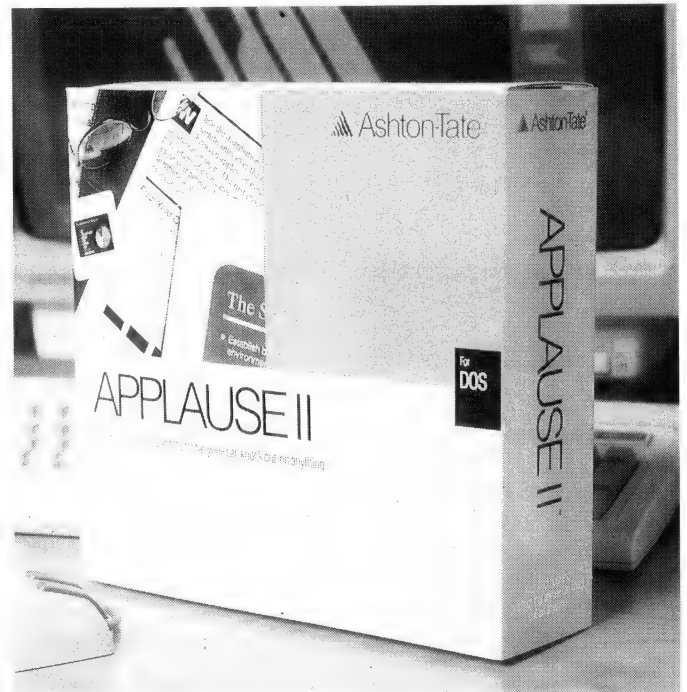
PROGRAM INTEGRITY MENU

- Check Integrity of marked files
- Recalculate Marked Files
- Display List of marked files
- Mark and save Boot Sectors
- Mark programs
- Return to Main Menu

Virusafe

Melbourne Business Essentials
 Ph: (03) 816 9500
 Fax: (03) 816 9511
 Price: \$199 (includes upgrades for 12-months)
 Eliashim Microcomputers of Haifa, Israel, have released version 3.3 of Virusafe, which can detect some 80 viruses and remove over 50 of

them. The program is memory resident and monitors any changes to program files and detects any of the viruses known to it if they attempt to enter RAM – a warning is sounded and the computer is 'locked'. There are three modules to the package: Virus-Check checks against already resident viruses; Virus-Safe prevents viruses from entering the system; and PIC (Program Integrity Check) checks program files on boot up.



Applause II

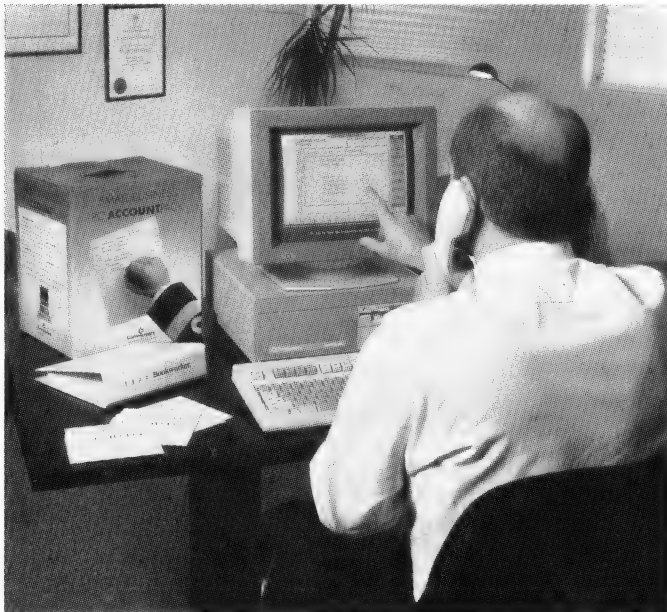
Ashton-Tate
 Ph: (02) 953 9500
 Fax: (02) 953 9369
 Price: \$775
 (See below for upgrades)

Ashton-Tate's Applause II has a new graphical interface and support for a wide range of equipment from XT's to 8514A monitors with at least 512K of RAM. Thirty-seven automatically generated chart types are now supported. Other features are 5000 colors available onscreen, accurate screen representations of hardcopy output and support for windowing. Applause II can import data directly from other dBase and Framework; charts and graphics can also incorporate Lotus 1-2-3, Excel, ASCII and .DIF files – up to 6000 data points can be imported. As the foundation for future Ashton-Tate graphics products, users of Ashton-Tate Chart Master, Signmaster, Diagram Master and Draw Applause can upgrade for \$99; users of Lotus Freelance and Harvard Presentation Graphics can also upgrade for \$99.

PC Solution Pack

Commodore
 Ph: (02) 428 7777
 Price: According to system

Commodore is now offering bundled software with its IBM-compatible PC10-III and PC30-III computers – the offer includes free installation of the software at the user's site, a color monitor, floppy disks and an audio training course. The PC Student Pack is available with either a twin-floppy or hard disk computer and contains Bank Street Writer, a basic wordprocessing package, Type!, a typing tutor, and two



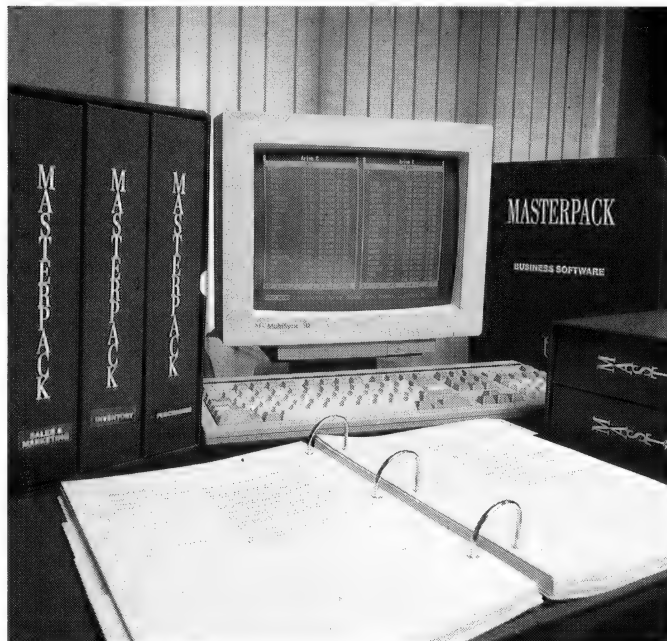
games, Where in Europe is Carmen Sandiego? and Karateka. Based on the same hardware, the PC Home Pack includes First Choice, an integrated package with a wordprocessor, a database, a spreadsheet and communications software, Type!, and the award winning SimCity. There are two Business Packs – each includes a PC30 computer with a 40Mb hard disk and EGA monitor. The Administration Business Pack includes Borland's Quattro Pro, a professional spreadsheet, and Sprint, a full-featured wordprocessor. The Business Account Pack has Sybiz Bookworker, a full-featured accounting package and SideKick Plus, a desktop organiser with calculator, phone book and diary.

Masterpack v2.1

McNamee Sutton Partners

Ph: (02) 439 3655

Price: Not supplied



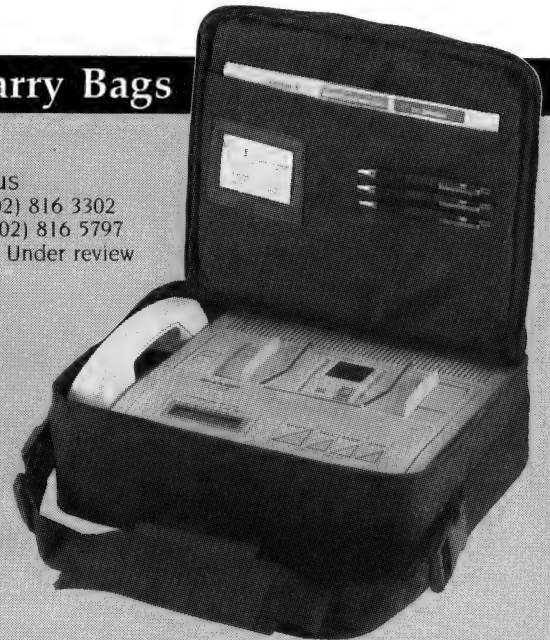
Carry Bags

Targus

Ph: (02) 816 3302

Fax: (02) 816 5797

Price: Under review



Targus has announced a range of specially designed carry bags for fax machines, Macintoshes and portable PCs. The Faxpac (interior dimensions 10.5 x 13.4 x 4.5 inches) has an adjustable divider, padding for the fax tray and an interior portfolio pocket; the Faxpac Plus has interior dimensions of 15.5 x 13.5 x 5 inches; both bags are rated at 50lb (about 23kg). Targus also has a range of carry bags for Macintoshes and the Imagewriter as well as the Lappac Deluxe (14.8 x 17 x 4 inches) for portable PCs.

McNamee Sutton Partners (MSP) has released version 2.1 of Masterpack, an integrated accounting and distribution package. Designed for use in importing, warehousing and distribution, shipping, publishing and retailing, the package has 14 modules including telemarketing, assets register, service management and utilities, plus a full range of accounting capabilities. The open architecture of the software makes it suitable for use with Ms-Dos, Pick and Unix computers, with one to 500 users. Masterpack is written in System Builder, an Australian developed 4GL; source code is supplied.

Card and Board Updates

Apple II SCSI card

Apple Computer

Ph: (02) 452 8000

Fax: (02) 452 8160

Price: \$245

Apple has released a new high-speed SCSI card for the Apple II and GS. Using DMA (Direct Memory Access), the card allows data transfers up to 1Mb per second between a GS and a SCSI device; with a IIe, transfers up to 0.5Mb per second are possible. The card is supplied with an on-board terminator to simplify setup; a terminator is still required at the end of the chain of

SCSI devices, however. Improved hard disk utilities for partitioning and verifying are also included, as is a backup utility that can handle the resource forks that are part of GS files. In addition, CD-Remote, the CD-ROM Desk Accessory for the GS, comes with the card.

10BaseT LAN adapters

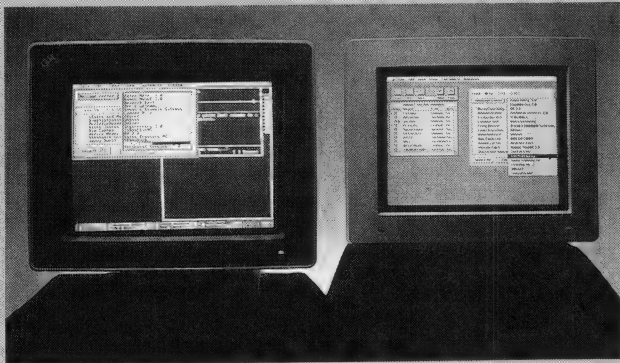
Tech Pacific

Ph: (02) 697 7111

Fax: (02) 662-8370

Price: \$469 EtherCard Plus 10T (XT- and AT-compatibles)

TOPS Networking



MicroAustralia

Ph: (02) 418 6242

Fax: (02) 418 6759

Price: \$369 TOPS Network Bundle for Dos

\$439 TOPS Network Bundle for Macintosh

\$1499 TOPS 10-Pack

\$135 Site upgrade to TOPS 3.0

IN CONJUNCTION with the release of its new range of TOPS cross-system networking solutions, the TOPS Division of Sun Microsystems has announced the appointment of MicroAustralia as official distributor. 'MicroAustralia, with its extensive network of dealers, gives us national coverage with offices in Sydney, Melbourne, Perth and Brisbane,' said Larry Preiser, intercontinental sales manager for TOPS.

The new products announced were the TOPS Network Bundle for Dos and the Macintosh, the TOPS 10-Pack, and the TOPS email packages InBox 3.0 and InBox Plus.

The TOPS Network bundle for Dos combines the new version 3.0 of the TOPS networking software for Dos, with the powerful new InBox 3.0 email system. TOPS 3.0 can be configured to use as little as 65K of conventional memory, supports the Hierarchical File System (HFS) and includes improved printer services. Standard Dos applications can now print via a TOPS network to a PostScript laser printer configured as a standalone station on the network, with simple PostScript translators provided for PC printer output.

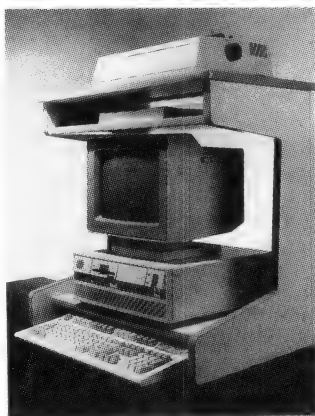
The Network Bundle for Dos is the first file sharing system to support extended memory. Dos extender technology has been incorporated into the TOPS/Dos file sharing software to dramatically reduce the amount of standard Dos RAM it occupies, increasing the memory available for applications. In addition the file sharing system has been rewritten in an optimised, modular fashion, giving users the ability to select only those network services they actually need. This flexibility in configuration further reduces memory requirements. PCs can act as fully functional file servers for Macintosh computers on the network by supporting HFS and the Apple Filing Protocol (AFP).

The TOPS Network Bundle for Macintosh includes improved AFP applications-compatible TOPS 3.0 file sharing software, InBox 3.0 and Macintosh administration software and printing services. The shared environment extensions in the AFP have been incorporated into the new version to make TOPS fully AFP applications-compatible. All leading Macintosh applications, including multiuser applications such as 4th Dimension, Fox-Base+ and FileMaker II, have been thoroughly tested and work with TOPS 3.0. Extremely large networks can be created as the TOPS Network Bundle for Macintosh now supports the AppleTalk limit of 254 zones and up to 254 servers per zone without the risk of limiting access to some users.

Both network bundles feature InBox 3.0, a powerful but easy-to-use email system, offering sophisticated electronic messaging for up to 20 users. InBox is the only email system enabling both PCs and Macintosh computers to act as non-dedicated servers or 'message centres' storing each user's mail. InBox is easily installed and administered by users, offering the perfect electronic mail solution for work groups, and includes such features as personal address books, comprehensive mail management, storage boxes and multiple file enclosures. File translators convert between Macintosh and PC file formats for all popular applications and add graphics translations for PICT and TIFF file formats.

'Users are asking for a networking system that is easy-to-buy, easy-to-use and easy-to-install, and that provides the essential services for an entire organisation, from work-groups to global enterprises. By combining our new TOPS 3.0 with InBox 3.0 and network printing and file translation tools, we are providing a complete network solution in a single package,' Preiser said.

Other Updates



\$539 EtherCard Plus 10T/A (MCA systems)

Western Digital have released two new Ethernet LAN adapters based on the IEEE 10BaseT 802.3 standard. Both include connectors for twisted pair wiring and AUI cable and complement Western's LattisNet-compatible twisted pair products. The EtherCard Plus 10T will work with all XT- and AT-compatibles, regardless of clock speed. It features an 8K RAM and a boot ROM option, configurable from 16 to 64K. The 10T/A operates with all MCA (Micro Channel Architecture) systems and features a 16K dual port buffer and a similar boot ROM option.

PC Hutch

Sylex

Ph: (02) 647 2888

Fax: (02) 648 0701

Price: \$215

Sylex Ergonomics, designers and manufacturers of a large range of computer furniture, has released the PC Hutch. This compact, wooden 'workstation' features cable duct channels, through-the-top paper feed for bottom feed printers and protective edging.

Bureau Service

Doctor Disk

Phn: (09) 328 2011

Fax: (09) 328 9661

Price: See below

Perth-based Doctor Disk is now able to handle disk conversions to and from the odd-sized, Amstrad 3-inch disks. This is in addition to the bureau's ability to copy and convert almost every disk and tape format currently in use. Costs vary with targets and quantities, but start from \$58 for a single disk, plus \$3.90 for a 5.25-inch target, or \$4.90 for a 3.5-inch target. The Disk Doctor also offers an OCR service (from \$0.95 for an A4 page), straight disk duplication (from \$0.80, including labeling), a modem transmission bureau and a disk recovery service. The company has branches in all mainland state capitals and Auckland.



LARRY LEWIS

Maestro-ing communications

WELL THERE ISN'T much sitting around in Prophet-land right at the moment. The savior, money-wise, for Prophet didn't turn up, nor has anyone seriously offered any major assistance. Remember last month when I told you about my experience with Telecom? Well, there was one section that really tried to do something to help, and even came out and tested my lines to find out why they were bad. Congratulations to Telecom's technical area – shame it didn't finished the job, though!

But, the so-called customer service group not only has extreme difficulty in understanding that they serve the customer, but their efficiency reminds me of a bunch of Keystone cops. For example, when we canceled the multiple lines for Prophet we wrote them a letter and even hand delivered it. The lines were eventually disconnected – they also disconnected our private line. When confronted, of course, they said it wasn't their fault because some other area did it.

Complete BBS Registry Listing

WE PUBLISH THE COMPLETE listing for the ACT and New South Wales in July, October, January and April; the listing for Victoria, Tasmania and the Northern Territory in August, November, February and May; and South Australia, Western Australia and Queensland in September, December, June and March.

Registration of Bulletin Boards are only accepted electronically at the primary electronic collection points – please address all enquiries through them.

Maestro-ing

IT IS VERY unusual to get a piece of equipment to review and then be told that I was not being asked to write anything about it. But, that is what happened when I was sent a Maestro ZXR to look at from the guys up in Kincumber, NSW. I can't say that I blame them though, as they mentioned to me 'we are still smarting after the last review you did on one of our modems when you called us (almost) cheap and nasty'.

Now, although that might not be a comment that would make me forever endeared to a supplier, it is what I believed at the time. But that was almost two years ago now, and things have changed a lot. I have been playing with the latest Maestro ZXR modem to see how it stands up under my usual picky nature and – wait for it! – I like it!

The model I had was not fitted with non-volatile RAM (NVRAM) – it's a \$30 option – but I think that it should be made standard as it's an extremely useful feature. The command set is functional

and easy to manage, and getting the modem up and running is a breeze.

I found that the connections to other Bulletin Boards were easy and reliable. I did have some problems with noisy lines, but they're a fact of life in my neck of the woods. The modem performed very well under my test conditions (which are renowned to make lesser modems turn to water).

The presentation of the modem is good, its case and leads are more than acceptable, and the status LEDs provided are sufficient for normal usage. There are several variants to the modem, including a cut-down Maestro ZX modem and an MNP 5 Data Optimiser.

There are two things I don't like. First, the documentation – although it has all of the information that you could ever need to run the modem, the presentation is not up to scratch. I had a look at another modem in the same price range and it had a professional-looking manual that wouldn't have cost much more to produce.

Secondly, the power pack is so large that it obstructs the adjacent outlet. For many users this would not be an issue at all, but it was a pain for my setup.

That aside, Maestro's after-sales support is second to none from reports I have had, and they seem to *care* about their customers! If you're in the market for a modem, give Maestro a call on (043) 68 2277; fax (043) 68 2731. □

Primary electronic

collection points

ACT – PC Exchange RIBM
(062) 58 1406

NSW – Prophet TBBS
(02) 628 5222

Vic. – Custom Programming
Opus (03) 848 3331

Qld. – AMPAK Opus/PRBBS
(07) 263 7070

SA – Oracle PC-Network
(08) 260 6222

WA – Nemo Multiple BBS
RAPL (09) 370 1855

Tas. – Hobart Users Bulletin
Board (002) 43 5041

BBS Listing 9004

Sun 1 Apr 1990

New systems: 22
Online: 7
Unknown: 9
Offline: 14
Name Change: 5
Amended: 24
Total Systems: 409

QUEENSLAND

Access Australia BBS

Sysop: William Brackenridge
Phone: (07) 284-6990
FIDOnet: 3-640/207
Baud: V21 V22 V22bis V23
Access: Public

Access North Queensland

Phone: (070) 51-0566
Baud: V21 V22 V23
Access: Reg LVA
Computer: IBM XT Clone

DOS: MS DOS
BBSoftware: CMVideoTeX

AMPAK NorthGate/PRBBS

Sysop: Brian Wendt
Phone: (07) 263-7070
FIDOnet: 3:640/205
Baud: V21 V22 V22bis V23 V32 PEP
Access: Public
Computer: PROFOUND 386/25
DOS: MS DOS
BBSoftware: Opus

Apple-Q Inc. BBS

Sysop: Vince Crosdale/Graham Black
Phone: (07) 851-1711
Baud: V21 V22 V22bis V23
Access: Reg VA
Computer: Apple IIe
DOS: ProDOS
BBSoftware: GBBS Pro

CHILDS PLAY BBS

Sysop: Mick McCormick
Phone: (07) 354-3020
FIDOnet: 3:640/354
Baud: V21 V22 V22bis
Access: VA
Hours: Daily: 2100 - 0600
Computer: IBM XT Clone
DOS: MS DOS
BBSoftware: QuickBBS

Commodore Computer Users Group Qld

Sysop: Graeme Darroch
Phone: (07) 808-7694
FIDOnet: 3:640/304
Baud: V21 V22 V22bis V23 V32
Access: Mem Reg VA
Computer: IBM XT
DOS: MS DOS
BBSoftware: Opus

COMTEL BBS

Sysop: Warren Mason
Phone: (077) 89-1655
FIDOnet: 3:640/740
Baud: V21 V22 V22bis V23 B103 B212
Access: Mem LVA
Computer: FUJITECH ST
DOS: MS DOS
BBSoftware: Lynx

Contention BBS

Sysop: Gregory Bradley
Phone: (077) 73-7524
FIDOnet: 3:640/720
Baud: V21 V22 V22bis V23
Access: Reg
Hours: Daily: 2300 - 0600
Computer: IBM Clone
DOS: MS DOS

BBSoftware: Opus

ECLECTIC EMPIRE

Sysop: Tony Smith
Phone: (077) 74-1190
FIDOnet: 3:640/701
Baud: V22 V22bis
Access: Reg LVA
Hours: 2030 - 0830 daily
Computer: IBM XT
DOS: PC DOS
BBSoftware: Dutchie

EDUCATIONAL BBS

Sysop: Andrew Waddell
Phone: (07) 266-3369
Baud: V21 V22 V22bis V23 V32
Access: Mem VA
Computer: IBM 386 Clone
DOS: MS DOS
BBSoftware: Mailbox

Electric Dreams BBS

Sysop: Joe Altoff
Phone: (07) 399-1322
Baud: V21 V22 V22bis V23
Access: Mem VA
Computer: Apple

ESE ESCAPE BBS

Sysop: Mark Garlipp
Phone: (07) 371-4403
FIDOnet: 3:640/371
Baud: V21 V22 V22bis V23
Access: Public
Computer: IBM 386sx Clone
DOS: MS DOS
BBSoftware: OPUS

FAR-NOR-64 BBS

Sysop: Ian Pearce
Phone: (070) 54-6892
Baud: V21 V22 V23 B103 B212
Access: Mem Reg LVA
Computer: C-64
DOS: BASIC IEEE
BBSoftware: BBS64

Genius BBS

Sysop: Jeremy Howell
Phone: (07) 870-2819
FIDOnet: 3:640/486
Baud: V21 V22 V22bis V23
Access: Public
Computer: IBM XT Clone
DOS: MS DOS
BBSoftware: QuickBBS

GOLD COAST Bulletin Board.

Sysop: Glenn Dawson
Phone: (075) 39-1732
FIDOnet: 3:640/935
Baud: V21 V22 V22bis V23 B103 B212
Access: Mem LVA
Computer: Star 10 XT IBM clone
DOS: MS DOS
BBSoftware: QuickBBS

Grammar BBS

Sysop: Barry Taylor
Phone: (077) 72-6052
FIDOnet: 3:640/702
Baud: V21 V22 V22bis V23 V32
Access: Reg LVA
Computer: IBM XT Clone
DOS: MS DOS
BBSoftware: Opus

Greenhorn Experimental - Brisbane ?1

Sysop: Mike Richardson
Phone: (07) 208-7663
FIDOnet: 3:640/301
Baud: V21 V22 V22bis V23 PEP
Access: Mem LVA
Computer: IBM 386 Clone
DOS: MS DOS
BBSoftware: RemoteAccess

Gumtree BBS

Sysop: Peter Brewer
Phone: (075) 63-2621
FIDOnet: 3:640/601
Baud: V22 V22bis
Access: Mem Reg
Hours: Weekdays: 2100 - 0800-
Weekends: 24 Hours
Computer: IBM XT Clone
DOS: MS DOS
BBSoftware: Opus

Hi-Tech CBBS

Sysop: Clyde Smith-Stubbs
Phone: (07) 300-5235
Baud: V21 V22 V23

High Flyer BBS

Sysop: David Klaverstyn
Phone: (075) 57-1127
FIDOnet: 3:640/571
Baud: V21 V22 V22bis V23
Access: Public
Computer: IBM XT Clone
DOS: MS DOS
BBSoftware: QuickBBS

Hitch-Hikers Guide to The Galaxy BBS

Phone: (07) 369-9726
Baud: V21 V22
Hours: Daily: 2200 - 0730
BBSoftware: RemoteAccess

House of Hawk

Sysop: Hawk
Phone: (075) 91-6357
Baud: V21 V22
Access: Reg LVA
Hours: Weekdays: 2000 - 0600-
Weekends: 2000 - 0800
Computer: Apple
DOS: ProDOS
BBSoftware: GBBS

LANAI

Sysop: Ray Nugent
Phone: (075) 92-1947
FIDOnet: 3:640/921
Baud: V21 V22 V22bis V23 V32
Access: Public
Computer: 386 MAX
DOS: MS DOS
BBSoftware: RemoteAccess

Listline Experimental

Phone: (07) 353-3718
Baud: V21 V23

Little Greece BBS

Sysop: The Little-Wog
Phone: (07) 345-8520
FIDOnet: 3:640/344
Baud: V21 V22 V22bis V23
Access: Public
Computer: ACS Technology 386
DOS: MS DOS
BBSoftware: QuickBBS

Mackay High School BBS

Sysop: Bob Chalmers
Phone: (079) 51-4815
Access: Public
Hours: Weekdays: 1600 - 0730-
Weekends: 24 Hours

Marlin-Coast BBS

Sysop: Ray Chalmers
Phone: (070) 57-7658

FIDOnet: 3:640/501
Baud: V22 V22bis B103 PEP
Access: Reg VA
Computer: Pericomp 386/20
DOS: MS DOS
BBSoftware: Opus

Marwick's MadHouse

Sysop: Paul Marwick
Phone: (07) 371-5864
FIDOnet: 3:640/820
Baud: V22 V22bis PEP
Access: Mem VA
Computer: Skai 386/20
DOS: MS DOS
BBSoftware: Opus

Michael's Scouting

Sysop: Michael
Phone: (076) 66-3655
Baud: V21 V22 V22bis V23
Access: Public
Computer: IBM XT Clone
DOS: PC DOS
BBSoftware: Opus

Modem Magic

Sysop: John Wain
Phone: (07) 264-4747
FIDOnet: 3:640/212
Baud: V21 V22 V22bis V23
Access: Reg VA
Computer: IBM 386 Clone
DOS: MS DOS
BBSoftware: Opus

Moonbase BBS

Sysop: Malcolm Harvey
Phone: (075) 58-1108
Baud: V22 V22bis
Access: Public
BBSoftware: QuickBBS

Nightlife QuickBBS

Sysop: Jonathan and Gillian Levine
Phone: (07) 849-5927
FIDOnet: 3:640/349
Baud: V21 V22 V22bis V23
Access: Public
Computer: IBM XT Clone
DOS: MS DOS
BBSoftware: QuickBBS

NQ Connection

Sysop: Geoff Gordon
Phone: (077) 79-7660
FIDOnet: 3:640/710
Baud: V22 V22bis PEP
Access: Reg VA
Computer: Kaypro XT
DOS: MS DOS
BBSoftware: Opus

OZ Board

Sysop: Tim Spray
Phone: (077) 21-3592
FIDOnet: 3:640/715
Baud: V22 V22bis PEP
Access: Reg LVA
Hours: Daily: 1800 - 0600
Computer: IBM AT Clone
DOS: MS DOS
BBSoftware: Opus

Phoenix BBS

Sysop: Kelvin Saggars

Phone: (07) 800-4660
Baud: V21 V22 V22bis V23
Access: Mem

Radio Experimenters Group BBS

Sysop: Chris Joyce
Phone: (07) 273-7081
Baud: V21 V22 V22bis B103 B212
Access: Reg LVA VA
Computer: IBM XT Clone
DOS: MS DOS
BBSoftware: Opus

Redcliffe Library

Sysop: Andrew Osborne
Phone: (07) 283-0315
FIDOnet: 3:640/203
Baud: V21 V22 V22bis V23 B103 B212 PEP

DOS: MS DOS

Sugar City BBS

Sysop: John McQuire
Phone: (079) 52-3928
Baud: V21 V22 V22bis
Access: Public
Computer: INI-X-10
DOS: MS DOS
BBSoftware: RBBS PC

Sun Central BBS

Sysop: David Sonter
Phone: (07) 890-1453
FIDOnet: 3:640/390
Baud: V21 V22 V22bis V23
Access: Public
Computer: IBM Clone
DOS: MS DOS

Computer: Hyndai 16T
DOS: MS DOS
BBSoftware: OPUS

The Galaxy Mail Dispatch

Sysop: James Collins
Phone: (07) 207-9316
FIDOnet: 3:640/316
Baud: V21 V22 V22bis V23 PEP
Access: Reg LVA
Computer: IBM 386/33 Clone
DOS: MS DOS
BBSoftware: RemoteAccess

The Lian's Den

Sysop: Yvette Lian
Phone: (07) 300-1152
FIDOnet: 3:640/352
Baud: V22 V22bis V23
Access: Public
Computer: President 286
DOS: MS DOS
BBSoftware: QuickBBS

THE LIGHTHOUSE BBS

Sysop: Jason Trump
Phone: (071) 91-1167
GTnet: 307/001
Baud: V21 V22 V22bis V23 V32
Access: Mem Reg VA
Computer: CCS XT
DOS: MS DOS
BBSoftware: GTPower

The Missing Lynx CIBS

Sysop: Mike Barber
Phone: (07) 808-3094
FIDOnet: 3:640/808
Baud: V21 V22 V22bis B212 PEP
Access: Public
Computer: 2 x XT's on LAN
DOS: MMS DOS
BBSoftware: Lynx

The Sower BBS

Sysop: Peter Maurici
Phone: (071) 41-6734
FIDOnet: 3:640/416
Baud: V21 V22 V22bis V23
Access: Reg LVA
Computer: IBM AT
DOS: DOS
BBSoftware: OPUS

Toowoomba RBBS

Sysop: Chris White
Phone: (076) 30-1762
Baud: V21
Access: Mem Reg LVA
Hours: Daily: 2100 to 0630
Computer: C-128

Townsville Apple Bulletin Board

Sysop: Christopher Griggs
Phone: (077) 73-3651
Baud: V21 V22 V23 B103 B212
Access: Mem Reg LVA
Computer: Apple //e
DOS: ProDOS
BBSoftware: GBBS

Transcendental Connection

Sysop: Kenneth Page
Phone: (07) 281-9418
Baud: V21 V22 V22bis V23
Access: Reg VA

Computer: Amiga 1000
DOS: AmigaDOS
BBSoftware: Atredes

XENTEK

Sysop: Ken Speakman
Phone: (07) 807-4808
Baud: V22 V22bis
Access: Public
Computer: Intel 386
DOS: SCO XENIX
BBSoftware: XBBS

WESTERN

AUSTRALIA

ACCESS LINE

Sysop: Michael Bate
Phone: (09) 490-2085
FIDOnet: 3:690/615
Baud: V21 V22 V22bis V23 B103 B212
Access: Public
Hours: Daily: 2000 - 0900
Computer: IBM AT Clone
DOS: MS DOS
BBSoftware: RemoteAccess

Gamma Istari

Sysop: Richard Dale
Phone: (09) 493-1534
FIDOnet: 3:690/626
Baud: V21 V22 V22bis V23 B103 B212
Access: Mem LVA
Computer: IBM AT
DOS: MS DOS
BBSoftware: Opus

GOLDFIELDS Opus

Sysop: Graham Clark
Phone: (090) 21-7755
FIDOnet: 3:690/643
Baud: V21 V22 V22bis V23
Access: Public
Computer: IBM XT Clone
DOS: MS DOS
BBSoftware: Opus

Lightning BBS

Sysop: Simon Blears
Phone: (09) 275-8225
FIDOnet: 3:690/601
Baud: V22 V22bis PEP
Access: LVA
Computer: Compaq 386s
DOS: Compaq DOS
BBSoftware: Opus
Note: V21 B103 is NOT supported

Mini Omen

Sysop: Greg Watkins
Phone: (09) 279-8555
Baud: V21 V22 V23
Access: Public
Computer: TRS-80
DOS: NewDos
BBSoftware: Omen

Murdoch University ES-BBS1

Sysop: Roger Atkinson
Phone: (09) 332-2604
Baud: V21
Access: Mem VA

*The so-called customer service group
has extreme difficulty in
understanding that they
serve the customer.*

Access: Reg VA
Hours: Weekdays: 1700 - 0800-
Weekends: 24 Hours
Computer: Hyundai AT
BBSoftware: Opus

Rock Cave BBS

Sysop: Rick Dalley
Phone: (07) 395-1809
Baud: V21 V22 V22bis V23
Access: Mem VA
Computer: IBM XT clone
DOS: MS DOS
BBSoftware: Mailbox

Silicon Data BBS

Sysop: Bruce Cifuentes
Phone: (07) 391-6176
FIDOnet: 3:640/391
Baud: V21 V22 V22bis V23
Access: Public
Computer: ULTRA AT
DOS: MS DOS
BBSoftware: Opus

SIMCOM BBS

Sysop: Patrick Simonis JP
Phone: (07) 341-7407
FIDOnet: 3:640/841
Baud: V21 V22 V22bis V23
Access: Mem Reg LVA
Computer: IBM AT Clone
DOS: MS DOS
BBSoftware: Opus

STParadise

Sysop: Steve Lawrence
Phone: (07) 847-1003
FIDOnet: 3:640/847
Baud: V21 V22 V22bis V23
Access: Reg VA

BBSoftware: Lynx
Note: Registration required for full access.

Sunshine Coast Connection

Sysop: Brian Boseley
Phone: (071) 44-2889
FIDOnet: 3:640/401
Baud: V21 V22 V22bis V23
Access: Public
Hours: Mon - Sat: 2000 - 0800Sun:
24 Hours
Computer: IBM AT Clone
DOS: MS DOS
BBSoftware: Opus

Swiss Connection

Sysop: Andrew Osborne
Phone: (07) 283-0314
FIDOnet: 3:640/204
Baud: V21 V22 V22bis V23
Access: Reg VA
Computer: IBM AT
BBSoftware: Opus

The Centre Baud

Sysop: RAM
Phone: (07) 368-1239
FIDOnet: 3:640/378
Baud: V21 V22 V22bis B103 B212
Access: Reg LVA
Computer: IBM AT Clone
DOS: MS DOS
BBSoftware: Lynx

The Flying Scotsman

Sysop: Graeme Willox
Phone: (07) 297-5265
FIDOnet: 3:640/297
Baud: V21 V22 V22bis V23
Access: Reg VA

THE IMPORTANCE OF BEING UNIX

IF THERE IS one thing that the Unix development race has taught us over recent years it is that the user will be the ultimate winner. Rival players are on an even keel to the extent that the issue of who can integrate the most bells and whistles into their operating system architecture no longer matters. Rather, the leading edge battle will be fought in the field of innovative applications development. That is, after all, where the whole thing began.

To understand the emergence of Unix, one must look back towards the days when computer dinosaurs ruled the earth and Bell Laboratories was using perhaps the first interactive multi-user operating system, Multics, an early development of Honeywell Information Systems. In the meantime, European universities were doing their best to arrest the iceage, trying to salvage the

What is Unix? Or maybe more importantly, why is Unix? Industry commentator Nigel Rappaport takes a piercing, if somewhat offbeat look at the operating system conundrum, and where it may be taking us in the new decade.

suitable name: Unix. Unix was never intended for commercial use, however. The product was developed by researchers who needed a modern, by the then standards, system platform which would allow their project teams to share selected programming material while keeping other data private. But while Whitlam was delivering his famous speech on the steps of Parliament House, the Bell boys were busy granting tertiary institutions use of the Unix system for minimal financial gain.

In subsequent years, industry began recruiting computer science graduates who, accustomed to the advantages of Unix, became understandably frustrated with the limitations of existing architectures. The private sector, however, could not provide surcease from sorrow and their employees simply had to adjust.

To cut a long story short, AT&T (formerly Bell Laboratories) figured everybody would eventually want a Unix-like system and it formed an alliance under the banner of Unix International. Its charter, you guessed it: develop a standard operating system platform for the commercial marketplace.

OSF and X/Open

IN 1988, THE public mudslinging reached a crescendo when several vendors, including Bull, IBM and Digital, discovered that membership of Unix International was restricted to AT&T and Sun. Their response was to establish the

Cambridge Multiple Access System and the Compatible Time Sharing System.

In the late '60s, the Bell Labcoats got together and decided to take all the best bits from these and other architectures and create their own platform. Reportedly, technicians and programmers were engaged in months of painstaking research until finally they came up with a



Open Software Foundation, which prompted angry debate from Unix International who maintained that OSF was trying to confuse the marketplace.

Not so, claimed OSF. A true standard required the cooperation of all players and AT&T was trying to make Unix proprietary. Meanwhile, what all concerned failed to notice was their target audience, the user, who was sitting in the sidelines screaming: 'I don't care who came up with the idea. I just want a finished product before I'm too old to see the keyboard!'

Enter X/Open, an organisation founded in 1984 by a consortium of European vendors labeled 'the Bison group' from the initials of the original members: Bull, ICL, Siemens, Olivetti and Nixdorf, joined in 1987 by AT&T, in 1988 by Fujitsu, IBM and Sun, and in 1989 by Prime, Hitachi and NEC.

X/Open's chief objective is to develop a common applications environment harbouring no alliance to any particular vendor's products and providing portability between Unix and proprietary architectures. And, that is where we are at and all players are discovering that they can not do it alone. Unix International has released its version of Unix (System V, release 4.0), while OSF is moving in leaps and bounds towards the completion of a graphical user interface. They are all headed for a win, particularly those companies specialising in proprietary architectures like Bull's GCOS 6, which can communicate fully with Unix platforms.

'If we're after a standard, why do we need proprietary architectures?' Good point. Remember the leading edge battle? Welcome to the front.

Once upon a time the innocent were led to believe that Unix would spawn that Utopian computing state where all

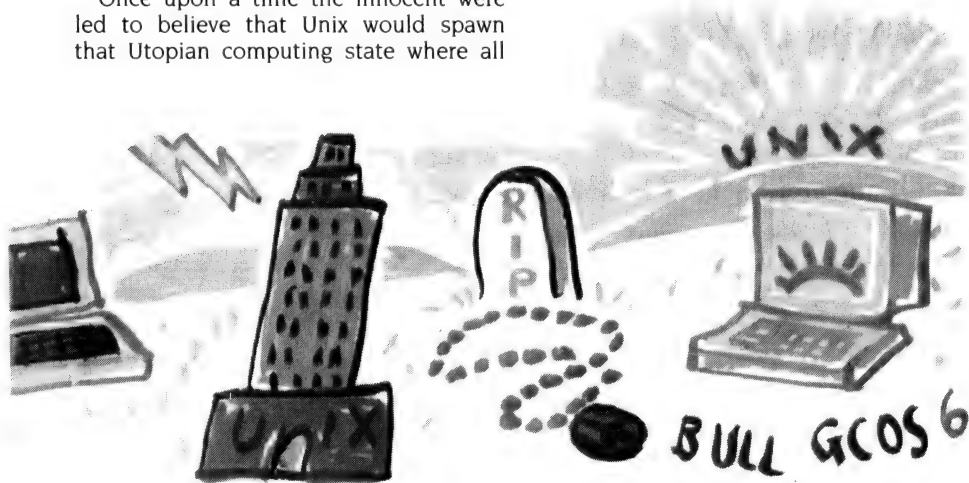
vendors would co-exist in peace and harmony, grow their hair long and demolish the class system. Hippiedom is dead - put away your beads. The vendor's main concern is now, and will always be, the bottom line. And, that is fortunate for users because they will reap the benefits of the best that the world's software community has to offer.

The computer industry has eagerly embraced the idea of a standard. Software houses, too, because they can no longer afford to covert their products to accommodate several different architectures. Hardware manufacturers, because Unix keeps their machine prices down by bridging disparate platforms. In the current decade, the salesperson will be armed with more than discounted products. What will count when negotiating that mega-deal will be innovative application offerings.

In the sophisticated marketplace of the '90s, the high prices, name calling and lacklustre promises can easily be dismissed. What can not be dismissed is the importance of the proprietary architecture world, because it is there that the dynamics of Unix will be truly exploited, it is there that the spirit of innovation will reach new heights, and it is there that the Baskin Robins effect will snowball offering user 31, 3,100 or 31,000 flavours to choose from.

Grab your scoop! ☐

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Macs from old '386s

I GUESS WE are a bit like rich kids brought up in a privileged environment – you don't ever get to question why poverty exists. Wealth and comfort are the natural order of things.

Have you ever wondered why it is that MS-Dos machines can only handle standard RAM memory up to a 640K limit? Or, why there are so many upgrades and system incompatibilities with MS-Dos? Or, why they need Windows on top of Dos? Or, why desktop publishing on a Mac is a breeze, whereas with IBM systems you need a full-year college course just to get the basics? Or, why Microsoft (the designers of MS-Dos) admit openly that their surveys show that Mac owners constantly run twice as many applications as MS-Dos owners, and (if you exclude data-entry operators) they use their machines twice as long each working day?

Well, before you start boasting, I've got to warn you to be wary about some of these claims of superiority. For a start, IBM clones and Macs are not simply interchangeable machines in most businesses – they fill different niches. Price is one consideration, the graphic user interface is another, and the range of applications available, is yet another.

Say you are the boss of a state-wide insurance company with a very large pool of typists just sitting all day hitting keys. It hardly makes sense to equip them all with Mac SEs as any reasonable IBM clone will do nicely. And, one simple run-of-the-mill wordprocessing program is all you'll need in the way of applications.

Let's face it. Apple abdicated this area of business because it wanted to concentrate on high-end machines with specialist applications. For many years you couldn't buy a Mac with a screen that didn't feel cramped (the larger screens only came with the Mac II), and the early keyboards left a lot to be desired. Then there was the problem with the mouse – touch-typists don't like mice – and also the lack of quick page-up, page-down keys, function keys, and the like.

The Mac has never been the ideal typists tool, and it wasn't even a reasonable facsimile until the Mac II and MultiFinder. I much preferred my old Apple II for text

input until the II came along. And, you've always been able to buy two IBM clones, fully equipped, for the price of one Mac. So, is it any wonder that the business world followed IBM?

The real reason why Mac owners use more applications is because the Mac niche is different. These survey companies are comparing Apples with oranges – to coin a phrase! And, please note that I didn't say *lemons*.

The Mac user in most business organisations was the odd-(wo)man-out. He (or she) was invariably the person who undertook different tasks with a computer – a wordprocessing machine it wasn't! If that wasn't the case, it would be impossible in most companies for the purchaser to justify departure from the norm. And, the purchasing norm (let's face it) is an IBM clone.

*For many years you
couldn't buy a Mac with
a screen that didn't
feel cramped.*

The Mac user, therefore, inevitably needed more than one application – if only to have a simple wordprocessor to write memos in addition to the specialist application for which the machine was originally purchased. And, since they had more than one application, and special uses, it was inevitable that they would use their machine more. In fact, at the price you have to pay for a Mac and two or three good applications, you need to spend a large part of your life sitting in front of the screen or the company accountant is going to start screaming.

Mac owners are specialist computer users, not just general workers who incidentally use a computer keyboard.

There is another usage factor here too. Integrated programs didn't sit well with the Mac in the early days. The first few versions of the machine had a limited

amount of memory and the operating system, with its graphic interface, was relatively large. So, generally there wasn't much RAM space left for integrated programs in the Mac before the MacPlus came on the scene.

AppleWorks

IT IS NO accident that the AppleWorks program on the old 128K Apple II was far superior to anything on the Mac for many of years. It provided wordprocessing, spreadsheet and database, but more to the point, it allowed any number of documents (up to 12) of any kind to sit on the desktop, available instantly for use – all this in 128K! The original AppleWorks is still one of the best (and most concise) programs ever written for general office use.

Following the success of AppleWorks, the IBM camp came up with a number of excellent integrated programs which soon held 25 per cent of the total software market. Symphony, Enable, Open Access II and Framework II, were all very popular and are still very widely used in stand-alones and on networks.

Thus, while in these surveys, Framework might only count as one application, it provides at least five different functions – wordprocessing, spreadsheet, database, graphics and communications. The Macintosh attempts at integrated software were uniformly disastrous (remember Jazz?) until Microsoft Works arrived (a very close copy of AppleWorks).

Eventually, Switcher and MultiFinder came along for the Mac and made integration possible at the lower (operating system) level – but note that this still treats all of the applications as individuals. If you've got five functions running under MultiFinder, then you've got five applications to be counted in surveys.

Thus, Mac/IBM comparisons are highly deceptive. In these circumstances, is it true that more applications are used on Macs, as the surveys claim? It could well be that more applications are needed on Macs to achieve the same levels of productivity gained through program integration.

I am not saying that this is the case – I

am just pointing out that general assumptions drawn from the present figures are highly doubtful. Apple and Microsoft imply that the greater Mac usage, and greater number of Mac applications, necessarily means a productivity increase for the worker. This case is certainly not proven. But does it matter anyway? The whole scene appears to be about to change once again.

The old limit of MS-Dos which restricted it to being able to handle only 640K of RAM memory has been removed by a number of 'work-arounds' using bank-switching techniques, and the emphasis in the top-end of the IBM PC world is now on OS/2 and the '286 and '386 chips which don't have this RAM address limit in their 'protected' mode.

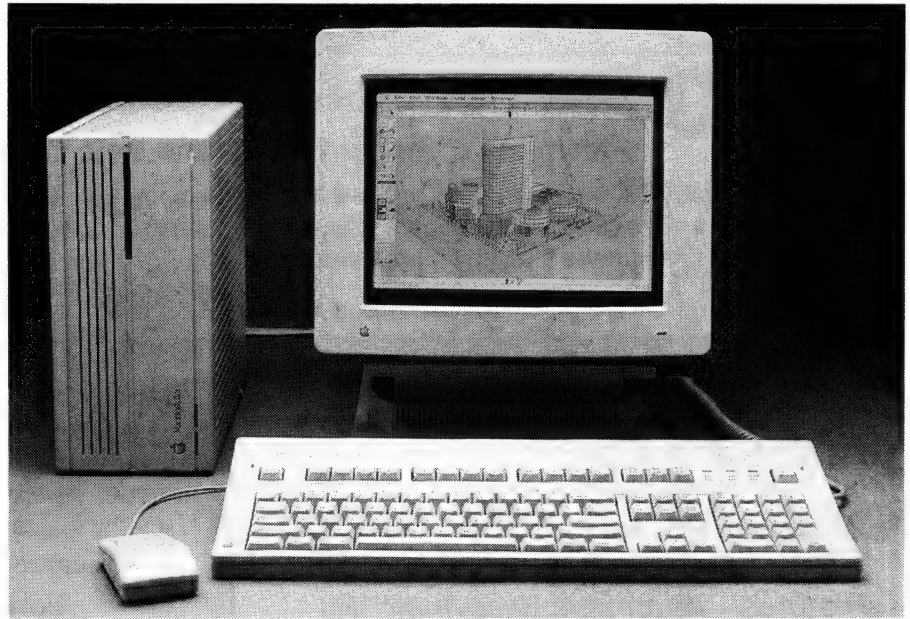
However, it should also be said that OS/2 machines will need about 8Mb of RAM to get about the same level of functionality that Mac II machines can provide with about 4 or 5Mb, which says something about Apple's ability to write system software.

Mind you, the Apple system-software writers have had the advantage of a closed box for many years, and they work for the company that both designs the hardware architecture and writes the system software at each stage in the machine's evolution. Microsoft's system programmers have to ride a line between the requirements of IBM and those of the clone makers lead by Compaq, so there must always be many compromises and trade-offs.

The Macintosh System 7.0 is an important stage in the development of the high-end Macintoshes because it also represents the first substantial split with the past. The Mac's operating systems have been reasonably evolutionary up until now, but the new System 7.0 can't run on the low-end machines. From now on, there are two Mac systems – just as there are now two IBM PC operating systems.

It is going to be interesting to compare OS/2 (when it gets some worthwhile applications) with the Mac's System 7.0 in real work-place comparisons on '386 and 030 machines. For the first time, the two rival architectures are running neck-to-neck on features, and purporting to serve the same markets, so reasonably valid conclusions can be drawn about which is better.

Both will use the Microsoft/Apple Royal outline fonts, database functions built-in to the operating system, and provide sophisticated graphic interfaces. Both also have a form of multitasking, but here, the



Surveys tell us that Mac users run twice as many applications as IBM users – the implication is that they are twice as productive. Maybe they need twice as many to be just as productive?

differences are greater than appear on the surface.

Differences

OS/2 WILL provide a pre-emptive form of multitasking, which is the old mainframe technique of rigidly allocating processing time between the foreground and background applications. The Macintosh is staying with non-pre-emptive multitasking – which may sound inferior, but it is not necessarily so.

Just to be clear about these differences, singletasking operations were those provided by the early personal computers – Macs, Apples, and IBMs under Dos. Pseudo-multitasking operating systems were later versions which allowed Desk Accessories (DA) and TSR programs to co-exist in what was essentially still a singletasking environment. Only one application/DA can run at a time, and the DAs needed to be specially written to remain accessible when an application was in use.

Non-pre-emptive (or cooperative) multitasking operating systems allow two or more relatively normal applications (plus DAs and TSRs) to co-exist on a computer's 'desktop', generally with only the foreground application active. You can switch instantly from one application to

another, as with MultiFinder on the Macintosh. Applications don't need to be specially written to work under cooperative systems if they are simply to lie dormant whenever they are in the background – but new versions of the software will be able to take advantage of 'background' processing through time-slicing the processor. Pre-emptive multitasking operating systems are the mainframe approach (Unix and OS/2) where the CPU time is fairly rigidly divided between all applications currently running – so processing will continue whether in the foreground or in the background. Applications need to be specially written for use on these systems.

But, because '286 and '386 machines also have a 'real' mode which emulates the old 8086 chip for which MS-Dos was designed, standard Dos programs can also be run on these machines by switching to this 'emulation' mode. The '386-based machines can also run Dos as if it were an application (they are said to 'run Dos as a task') under OS/2 in its pre-emptive multitasking ('protected') mode. This then provides a second way that a normal Dos application can run on a '386 machine, but here the program is at a third level above both Dos and OS/2.

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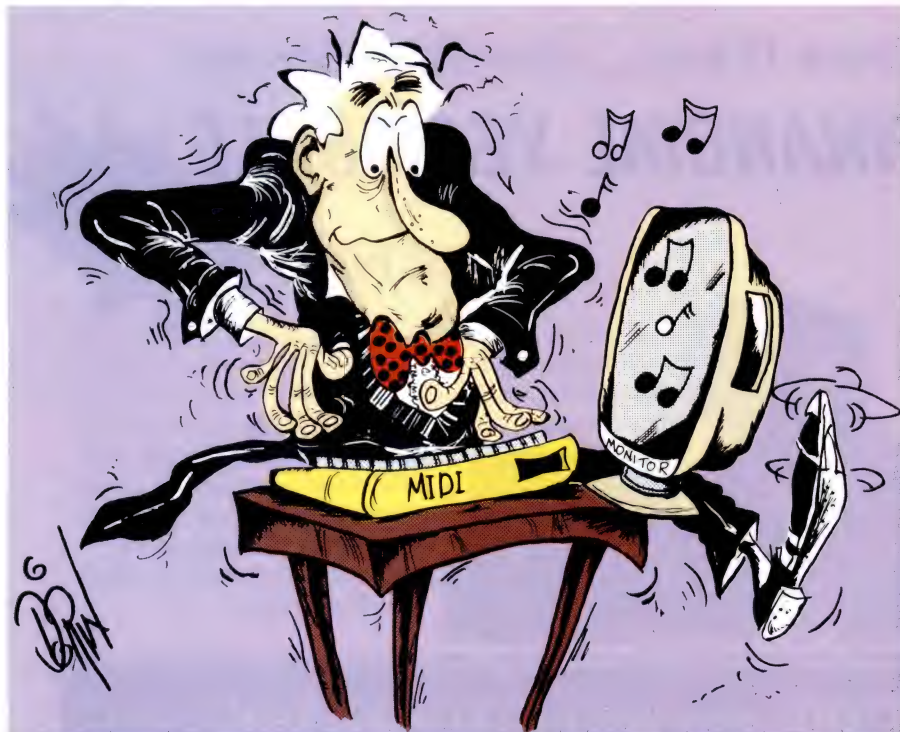
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Microsoft developed Windows to extend many of the Mac-like functions to Dos, and last year Hewlett Packard came up with NewWave, which existed over the top of Windows to make it look and feel like a real-Mac graphic interface. NewWave (which was chosen YC's Software Product of the Year for 1990) added an 'object-oriented' approach to the Windows 'finder' which makes it work, and look, like a Mac.

Just think of the possibilities. If you've learned to love the Mac but everyone around you uses IBMs, you no longer need to stay exclusively with Apple products. You can build yourself a Mac-like clone.

Buy an 8Mb '386 machine from IBM or one of the clone makers and have OS/2 running in protected mode at the first layer, with Dos as a task. Then you'll be able to add Windows over Dos, and NewWave over Windows.

And, provided there's no bugs in any of the systems, presumably you'll then be able to run one of your old Dos programs in a true pre-emptive multitasking environment, and have it look-and-feel like a Macintosh running System 7.0. Isn't technology wonderful? □

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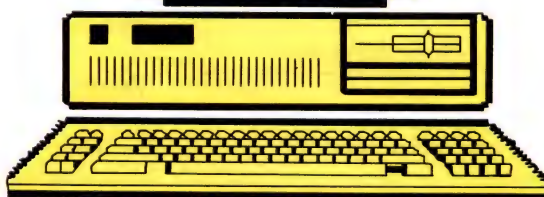
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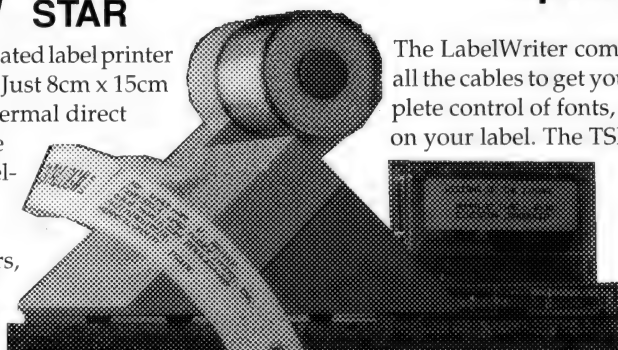
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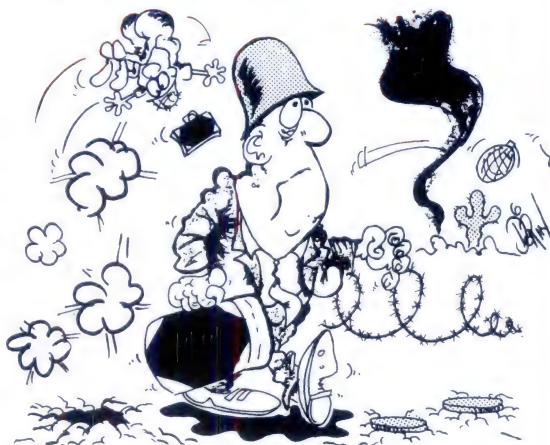
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**TIM
HARTNELL**

Basic Call

IN THE COLUMN this month we'll be looking at the Basic Call command, sharing a program in Basic for both the CPC and PC machines which produces a 'master menu' for calling your other programs, and introducing a little patch for Dos 2.0 and 2.1 users which sets the default value of Echo to Off in batch processing.

Mark Bridger, an expert in Basic programming, says that while Basic has many deficiencies as a programming language, it is the most popular and simplest language to use. However, if you want the features of Basic (Basic, BasicA or GWBasic), plus speed, control or extra effects which are not provided by Basic, one way to do this is to interface with an assembly language. Of course, this raises the problem of how to link and call an assembly language routine from a Basic program.

The problems of linkage are that Basic can only call a routine which is loaded into memory somewhere. In order to load, you use the Bload statement, and make sure that the subroutine does not overlap either Basic or your program.

One thing to note is that you can only Bload something which has been Bsaved. To Bsave something, you must be in Basic and have that something in memory at the same time. The only way to do this is by using that all-purpose tool, Debug.

Let's take a brief look at the Basic call procedure. One of the problems with Basic is where to put its machine language program. The Basic work segment is the first 64K of memory. If you have more than 64K, you can Bload the machine language anywhere above this segment – &H1700 is a popular choice. If you have a color graphics card (we're assuming you do here) you can even put programs fewer than 192 bytes at &H1F40 (between the even and odd buffers). Assuming 64K, and to be perfectly safe, you can reserve this space by beginning the program with a CLEAR,&H8C00 command. (Basic and Dos take up about 28K, leaving 36K. Then 36K - 1K = 35K = Hex 8C00.) The Bload command puts a routine in the default segment with an offset of 0 (Hex FC00).

Further details about the Basic Call

command are in your Basic Manual. Three clearly written books about assembly language are *The iAPX Book* (Intel); *IBM PC Assembly Language* (L. Scanlon, Brady Publishing); and *IBM PC Assembly Language Programming* by Dave Bradley.

Making a menu

I'VE WRITTEN A program which you can use as a 'front end' to shield you from having to run specific programs from the Dos or other prompt. The version on the program written in general Basic (see Listing 1) in the first line will work on the PC-

compatible Amstrads, as well as the 6128 CPC series machines. I've also tried it with the Microsoft Basic Compiler, and it compiles quite satisfactorily into an .EXE file when it can be used to call non-Basic programs, simply by including their names – as if they were Basic programs – in the quote marks near the end of the program.

Naturally, you should modify the program to suit your own needs. At the moment, it will call up to nine other programs, but you can easily modify it so that, for example, it uses letters of the alphabet rather than (or in addition to)

```

10 REM MENU MASTER (MENU.BAS)
20 SCREEN 0,0,0
30 WIDTH 80
40 KEY OFF
50 COLOR 0,7
60 DEF SEG=0:POKE &H417,
  (PEEK(&H417) OR &H40)
70 CLS
80 J=1:GOSUB 460
90 PRINT TAB(19);"Software from
  Interface Publications Pty. Ltd.,"
100 PRINT TAB(19);" 34 Camp St.,
  Chelsea, Vic., 3196
110 PRINT
120 COLOR 31,0
130 PRINT TAB(39);"MENU";SPC(38)
140 COLOR 0,7
150 J=2:GOSUB 460
160 PRINT TAB(20);"Touch the number of
  the option you want:"
170 GOSUB 460
180 IF INKEY$="" THEN 180
190 PRINT TAB(26);"1 -"
200 PRINT TAB(26);"2 -"
210 PRINT TAB(26);"3 -"
220 PRINT TAB(26);"4 -"
230 PRINT TAB(26);"5 -"
240 PRINT TAB(26);"6 -"
250 PRINT TAB(26);"7 -"
260 PRINT TAB(26);"8 -"
270 PRINT TAB(26);"9 -"
280 PRINT TAB(26);"- to ";:COLOR 31:
  PRINT "EXIT";:COLOR 0:PRINT
  " but stay in BASIC"
290 PRINT TAB(26);"- to ";:COLOR 31:
  PRINT "EXIT";:COLOR 0:PRINT
  " this menu and disk"
300 J$=INKEY$
310 IF J$=" " THEN COLOR 7,0:END
320 IF J$("<" OR J$(">") THEN 300
330 M=VAL(J$)
340 COLOR 7,0:CLS
350 IF M=0 THEN SYSTEM
360 IF M=1 THEN RUN ". "
370 IF M=2 THEN RUN ". "
380 IF M=3 THEN RUN ". "
390 IF M=4 THEN RUN ". "
400 IF M=5 THEN RUN ". "
410 IF M=6 THEN RUN ". "
420 IF M=7 THEN RUN ". "
430 IF M=8 THEN RUN ". "
440 IF M=9 THEN RUN ". "
450 GOTO 300
460 FOR X=1 TO J
470 PRINT
480 NEXT J=1
490 RETURN
  
```

Listing 1. This program can be used as a 'front end' to shield you from having to run specific programs from the Dos or other prompt. It will call up to nine other programs, but you can easily modify it so that, for example, it uses letters of the alphabet rather than (or in addition to) numbers, to cater for more programs.

PC8400 LETTERFALL: Learn to type whilst playing the letterfall game. Program has 16 levels and is suitable for beginners and advanced users alike. Type the falling word or letters as fast and accurately as possible.

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PC8402 FASTYPE TYPING TUTOR: Good touch typing tutorial for all levels. Starts with the basics, and progresses to advanced typing skills.

PC8403 TOUCH TYPING TUTORIAL: Touch typing tutorial program with a number of good features. Program includes Teach mode with 8 graduated lessons to actually teach you to type. Also included is a Game mode which adapts to the typists skill, forcing the user to type faster whilst enjoying an interesting game. Finally a Speed mode allows you to test your typing speed and accuracy. Also included are a number of practice files specific to legal and medical needs.

PC8404 QUICKTYPE: Game type program designed to help polish your touch typing skills. Use any ASCII text file to practice your typing on, and select your typing standard. The program provides feedback on your accuracy, your speed for the last sentence, and your average speed. As your speed increases so does the game speed.

PC8450 MEDICAL SIMULATION: Educational program for testing paramedics, medical students, and doctors. In the program you are presented with treatment alternatives in emergency situations and must select the correct course of action. Excellent tutorial for those involved in medical field.

PC8451A ECG TUTOR DISK 1: Educational program for medical personnel. Aids in the learning of basic Electro Cardio Graph interpretation using graphic representation of the ECG strips. Provides instructional information, as well as questions on the various ECG traces. **Requires PC8451B.**

PC8451B ECG TUTOR DISK 2: Second disk of ECG TUTOR program contains documentation and data files. **Requires PC8451A.**

PC8500: EXTOL: Programming language designed for Computer Aided Instruction which is particularly well suited for non mathematical domains. Includes number of sample files and can also handle graphics. Good for teachers.

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PC8503 QUIZGEN: Quiz generating program will create a randomly selected quiz from a master file of up to 150 questions. Different master files can be kept on different subjects. The program allows you to view both the master file and the selected quiz as well as printing out the quiz and the answer key.

PC8504 PC QUIZZER: Computer Aided instruction package that allows you to create lessons easily which can be presented to the students using windows which contain options, questions, answer prompts, and help. Graphics and music can easily be added. Quizzes are entered by using a standard ASCII word processor or text editor. Includes a number of sample quizzes.

PC8505 COMPUTER AIDED INSTRUCTION: PC-CAI is a computer language specifically designed to allow you to create computer driven tutorials, tests, and demos. It works much like a word processor. You enter your information using the programs built in editor, along with the various commands, and the program produces a ready to run application. Allows you to integrate text and graphics to produce great lessons and demonstrations.

PC8600 GKAL GRADE PROCESSOR: Teachers aid for totalling and doing various manipulations to students' scores. Program takes numerical grades entered via an ASCII text editor also included on the disk, and calculates totals and averages using multipliers or weights if required, and produces printed reports and histograms of results.

PC8601 THE GRADING ASSISTANT: Program designed to help teachers record students' grades throughout a period and easily produce student and class average reports. Various marks can be weighted, letter grades assigned, and even produces class roster reports for attendance checks.

STATISTICS/MATHS

PC8800 MTOOL: Mathematical function interpreter. Using almost any well behaved mathematical function of a single variable program will evaluate the function for any value or range of values of the independent variable, numerically integrate the function, evaluate the derivative of the function for a given value, find solutions and even plot the function.

PC8820 CURVEFIT: Program performs least squares curve fit on X, Y data. Curves for 25 equations are fitted. Equation coefficients, correlation coefficient, and best fit are computed.

PC8821 DATAPLOT: General purpose two dimensional data plotting system designed for scientific and engineering applications. Simple menu driven interface allows for easy scientific data analysis and presentation. Options include a number of different chart types, plots up to 10 curves on a single graph, and supports most adapters and plotters. Requires DOS 3.0 or higher and plotter for output.

PC8822 XY DATA ANALYSER: XY is a package that combines data analysis and graphic presentation. Particularly suited to laboratory applications it can be readily applied to any application requiring linear graphics. It allows for data entry and selection, curve fitting and calculation, plotting data and curves, and more.

PC8823 PWRSTAR: Numerical data analysis program. Provides a polynomial best fit to a given set of data. Will provide automatic display of input and the fitted curve. Two versions on disk, one for standard machines, and one for machines with a maths coprocessor chip.

PC8824 MATHPLOT: Set of graphics aided programs designed to help scientists and engineers analyse data. Routines are included for least square fitting polynomials to sets of data points, solving simultaneous linear equations, numerically integrating a curve defined by a set of data points, calculating simple statistical parameters for data sets, and for calculating the coefficients of a Fourier series for a periodic function described by a set of data points. Programs are also included for calculating and plotting Fourier Spectra and Bessel functions. Graphics are used and are suitable for all graphics systems.

PC8840A KWIKSTAT DISK 1: Graphics oriented scientific statistical analysis program. It can import ASCII and dBase files as well as building its own database. Menu driven, able to produce histograms, scatterplots, 3-D Bar Charts, and box plots as well as computing most statistical functions. **Requires PC8840B.**

PC8840B KWIKSTAT DISK 2: Second disk of KWIKSTAT program. **Requires PC8840A.**

PC8841 EPISTAT: Collection of programs written in BASIC for statistical analysis of small to medium sized data samples. More than 40 common statistical tests are performed by the programs included. These include students T test, rank sum test, linear regression, and correlations, plus standard statistical functions.

PC8842A SUPERSTAT DISK 1: Statistical package designed for analysing the results of market surveys and polls. The analysis provided is very complete. Up to 25 variables and 50 data columns are allowed. Graphics are provided in the form of bar and scatter charts. **Requires PC8842B.**

PC8842B SUPERSTAT DISK 2: Second disk of the Superstat package. **Requires PC8842A.**

```

REM MENU MASTER (MENUGEM.BAS)
' Version to run under BASIC2 and GEM
CLS:CLOSE #2:CLOSE WINDOW 3:CLOSE WINDOW
4:WINDOW #1 FULL ON
100 j=1:GOSUB 140
110 PRINT TAB(16);"Software from
Interface Publications Pty Ltd"
PRINT TAB(16);" 34 Camp St.,
Chelsea, 3196"
PRINT:PRINT TAB(35);"MENU"
j=2:GOSUB 140
PRINT TAB(20);"Touch the number
of the option you want:"
GOSUB 140
120 IF INKEY$="" THEN 120
PRINT TAB(26);"1 -"
PRINT TAB(26);"2 -"
PRINT TAB(26);"3 -"
PRINT TAB(26);"4 -"
PRINT TAB(26);"5 -"
PRINT TAB(26);"6 -"
PRINT TAB(26);"7 -"
PRINT TAB(26);"8 -"
PRINT TAB(26);"9 -"
PRINT TAB(26);"0 - to quit"
130 j$=INKEY$
IF j$="0" THEN END
IF j$<"1" OR j$>"9" THEN 130
m=VAL(j$)
CLS
IF m=1 THEN RUN ". "
IF m=2 THEN RUN ". "
IF m=3 THEN RUN ". "
IF m=4 THEN RUN ". "
IF m=5 THEN RUN ". "
IF m=6 THEN RUN ". "
IF m=7 THEN RUN ". "
IF m=8 THEN RUN ". "
IF m=9 THEN RUN ". "
GOTO 130
' Space Out
140 FOR x=1 TO j
PRINT
NEXT:j=1:RETURN

```

Listing 2. If you have an Amstrad PC which uses Basic2 running under GEM, use this version instead of Listing 1. The on-screen appearance is virtually identical to the general Basic one, except that no use is made of color. The third line is one you might like to adopt for use with other programs you write in Basic2.

numbers, to cater for more programs.

The general Basic program includes lines which are specific to IBM-type Basic (including the color commands, and the DEF SEG line). These lines should be left out, or modified, when you run the program on a 6128.

The second version of the program (see

Listing 2) is for Amstrad PCs which use Basic2 running under GEM. The on-screen appearance is virtually identical to the general Basic one, except that no use is made of color. The third line is one you might like to adopt for use with other programs you write in Basic2. If you include

3:CLOSE WINDOW 4: WINDOW #1 FULL ON at, or near, the beginning of your program, you'll find that it will close down the edit and command windows, and then give you a full-screen window in which your output will appear. The windows which you have closed will automatically re-appear when the program stops.

Defaulting to Echo Off for batch files

SOMETIMES IT IS convenient to have BATch files default to Echo Off mode. John Bridges tells us that the following patch sets the default value of Echo to Off in batch processing. Note that Echo will be On during execution of the AUTOEXEC.-BAT file, but will take effect with the next BAT file to be executed.

For Dos 2.0 use -

```

C:\debug command.com
-e1721 28 1f
-e364a 24 26 c6 06 6e 09 00 e9 19 e8
-w
Writing 4500 bytes
-q

```

And, for Dos 2.1 -

```

C:\debug command.com
-e1734 28 1f
-e364d 24 26 c6 06 6e 09 00 e9 19 e8
-w
Writing 4500 bytes
-q

```

John warns that the above commands should only be used by those who know how to use Debug. Different starting numbers than the above should be used for users with other than Dos 2.0 or 2.1.

We'll be including 'Your Amstrad' in future issues of YC. I'd be interested in hearing from any companies making, or importing, software and/or hardware for any of the Amstrad computers. As well, I'd be more than happy to share any of your discoveries, hints, tips, comments and programs with other users, along with details of any Amstrad-specific user groups. A copy of my *Amstrad PC Users Companion* (disk and manual) will be given to anyone supplying PC hints which are used in this column. I have some CPC software to provide in return for CPC hints. Please write to 'Your Amstrad', Tim Hartnell, Your Computer, PO Box 227, Waterloo 2015 NSW. □





JOHN BAILEY

Just what the doctor ordered

YOU MAY BE aware that the '90s is the decade of Landcare. This program is a great idea, but the farmers, foresters and miners will probably end up doing the work, so a software package that will help us to manage our impact on the environment is the subject of this month's offering.

I am a little cynical about the aims of a National Soil Conservation program that is allocated less money per year than the Parliament House gardens. Perhaps conservation is a bit like motherhood in that you can't be against it, but less than half the population will have anything to do with it so it doesn't attract the votes. The national Landcare program is about preserving the environment without starving to death in the dark. It is only the wealthy and privileged that can afford to preserve every tree and ban every chemical spray. The rest of us have a job to do, and the more biologically efficient we are, then the more softly we will impinge on the environment.

FarmAssist (which was briefly outlined last month) has nothing to do with chemist shops, but is a farm assistant for handling physical records. Paddock recording on paper can become a huge task, and it's not easy to decide which pieces of data to include. In the end, we tend to record everything or nothing. If you keep a detailed diary, then the purchase of FarmAssist will keep you tap-tap-tapping away at the keyboard for a while as you enter all your historical data. Those of us that have been very slack will find it a bit easier to get started, but, of course, we shall have to wait for results because the real value in FarmAssist lies in the correlation of historical data.

Farmers and businessmen

THE DESIGNERS of FarmAssist, John Rintoul and Maurie Booker, are farmers and businessmen who were keen record keepers but found the task of interpreting the records too daunting, so they decided that computers could do the job for them.

The main impetus behind their development of this software came from work done by Reg French of the South Australia

Perhaps conservation is a bit like motherhood in that you can't be against it.

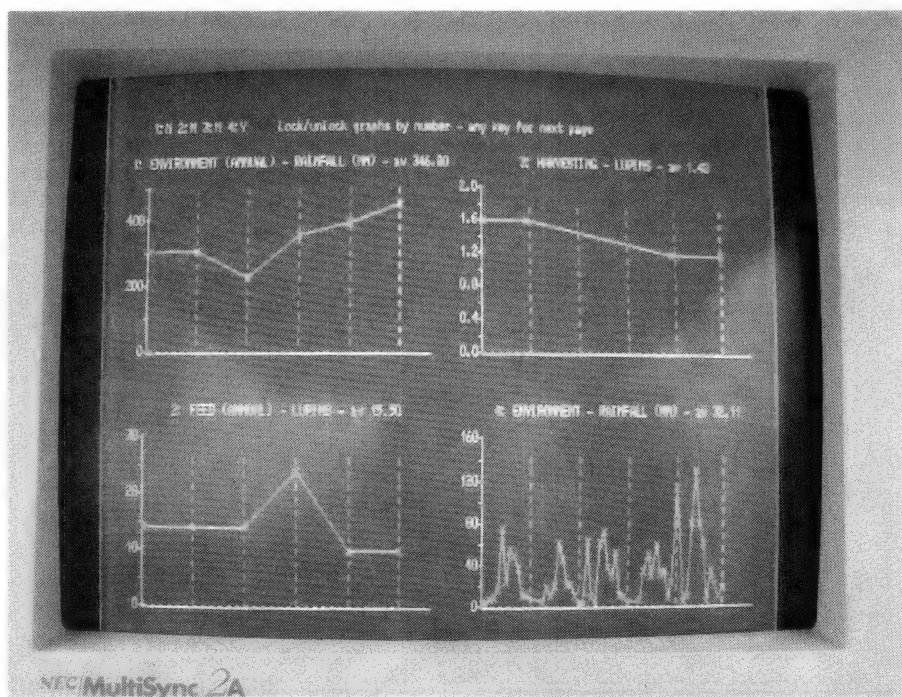
Department of Agriculture, who summarised the five parameters that affect crop yield as time of planting, weed control, disease control (particularly root diseases), crop nutrition, and rainfall.

Three of these factors are in the hands of the farmer by use of herbicides, crop rotation to break root disease cycles (in just the same way that we rotate crops in the vegie garden), and supply of the right amount of fertiliser and trace elements at the right time. The first factor is partly de-

pendent upon the time of opening rains.

Many farmers already make assessments of previous results and draw conclusions that aid them in making management decisions, but they are usually unable to quantify these results and thus the process is called experience. John Rintoul decided that there had to be a better way, and in conjunction with Maurie Booker and contract programmers, the 1989 Sydney Royal Easter Show award winner was created.

After determining that a paddock management approach was the best way to track production parameters, the main development criteria were ease of input, flexibility of output, and the ability to easily understand the output. To this end they designed data entry forms for carting out to the paddock and recording the details. These forms have the same entry boxes in the same order as the screen for



Using FarmAssist, comparison of various sets of figures is made easy by the presentation of graphs in groups of four on the screen - one can be held in the top left corner and compared with a series of graphs displayed in the other quadrants of the screen.

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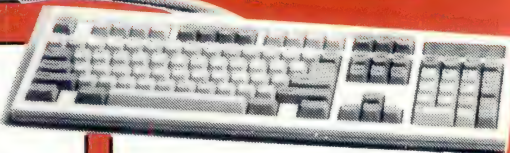
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With FarmAssist, results will be derived from real whole paddock experiences rather than from small scale test plots, and it can turn the whole farm into the best research station in the world, for its own individual situation.

each module, so once the information is on the sheet anyone can enter it into the computer. The entry screens do not demand great keyboard skills and make use of the number pad as much as possible. Repeat items are entered with a single keystroke.

Having entered the last ten year's worth of paddock information, saving every 15 minutes or so, and having backed up the hard disk every day, we now wish to extract some information. The great thing about the data display is that it is shown as a graph. Comparison of various sets of figures is made easy by the presentation of graphs in groups of four on the screen, and one can be held in the top left corner and compared with a series of graphs displayed in the other quadrants of the screen. Given sufficient historical information, there is no reason why our own farms cannot provide us with many answers that required extensive academic research prior to FarmAssist. The advantage of this is that our results will be derived from whole paddock experiences rather than from small scale test plots which do not

always reflect the real world, and it can turn one whole farm into the best research station in the world, for its own individual situation.

The program is written using Clipper and a fair number of DBF files which are indexed and searched as it goes about its business. Because of this, the installation process writes FILES=50 and BUFFERS=50 into the CONFIG.SYS file in the root directory. The software needs a hard disk to run, but the developers say that 40 year's worth of history over 50 paddocks will fit onto a 20Mb system. There are a few farms around that would have that much data stored on paper so they need more than a 20Mb hard disk. Some resident programs such as SideKick, and perhaps PC Tools, tend to interfere with FarmAssist, and therefore should be removed or bypassed.

Availability

I BELIEVE THAT this software is the best thing to hit agriculture since bulk handling of grain and hydraulic wool-presses. It comes with a well written manual and

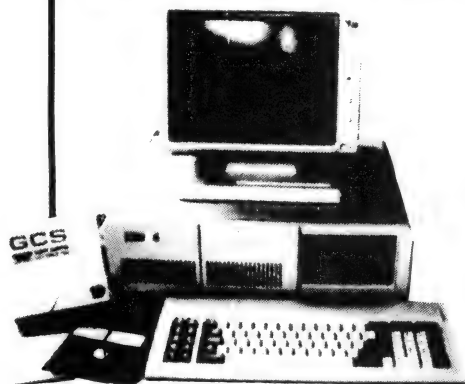
three paddock management folders with data entry forms from Dalgety Essex Technology, 4 Gwentyfred Rd, South Perth 6151 WA, (09) 474 1210, and costs \$885.

I hate press releases but I have to make an exception for this one, not because of the quality of the release or the software, but because of the issue raised. Softcover Software have announced the release of an asset management package called Fasset, which is supposed to do all things for asset management. The big deal is that fixed asset management is something that farmers are not always good at, even though they tend to be good at managing livestock and money. The program should be used by rural accountants and farm advisors rather than individuals, although there are many farms with machinery assets valued at more than the cost of their land and Fasset costs only \$299. The package is distributed by Softcover, 19 Barry St, North Sydney 2060 NSW; (02) 957 4010.

Next month I'll talk about Herbi-guide, a program designed to lead us through the maze of herbicides available. □

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INFORMATION TECHNOLOGY MAGAZINE

1929 WAS A WEDNESDAY AFTER WORK AT YOUR PLACE

Have you ever come across a computer that does everything you wanted? Well, if you have, you're lucky. Geoff Brice tells of his encounter when very little went right.



IF YOU WORKED at our place, you'd notice the difference. I don't read my copy through any more. It is a question of communicating any way I can, and I'll tell you why.

My computer has got a virus and no-one else will admit it. They just say, 'Ha ha ha, it's *you*'. But I know it's changed. It used to be your normal, placid, do-as-it's-told, run-of-the-mill computer. But now, it's totally user-hostile.

For one thing, after I've typed something there's this pause, as if it's *thinking* – deciding whether to bung it on the screen or not. And, sometimes it changes stuff like the odd word. I wrote a profile of the new manager for a newsletter, and '...always willing to debate' came out as '...ever willing to debauch ...'. I always said I should have stuck to a typewriter.

When I first got it (not a typewriter – this *thing*!) it used to do exactly what I said, but thesedays, it deliberately gets me worked up. The other day, for no reason at all, it wouldn't give me a 'wh o' without a space after the ... no! ... it's doing it again – wh o wh o wh o wh o (you rotten little b ...!) See what I mean? It's doing it again.

I don't know how it could have caught this virus. Well, actually, I do have my suspicions. Sometimes my disks have to go

into other computers, and heaven knows what they've been up to! I mean, they're tucked away in another part of the building now, and let me tell you, there are some pretty decadent looking machines in *there*, and the October 19, 1929, was a Wednesday, and October 19, 1929, was a Wednesday, and I'll see you Friday after work at your place at your place (stop it, stop it, you little b ...!) I'll get you for this. I'll tell *you* something, my Tandy never played up the whole time I had it!)

You can see what it's doing, can't you? It won't delete properly and it knows what I mean all right. Who could mistake a Delete? But it just pretends, and keeps bits back and then shoves them on the screen again – it can be weeks later. It does it just to embarrass me when someone *important* is looking over my shoulder, like the new manager. October, 1929 was a Wednesday, and I'll see you Friday after work at your place at your place (If you're not careful I'll spill a cup of coffee into your innards. That'll short you out for good, you little blighter).

Delete without warning

ANOTHER THING it will do, when I've spent five days composing something and pressed two keys to save it, is to delete the whole lot, just like that. Both sentences –

zapped!

Then it'll have a good laugh. I know when it's really amused, because it changes from yellow print on a blue screen to blue print on a yellow screen. Ha ha, you rotten little thing!

I've just had a thought! I could change it with someone else's ... I could come in early before work ... no-one needs to know ... then someone else would be reading all that stuff it keeps bringing up ... mmm!

And, another thing. When I tell it to copy (tell it? By this stage I'm screaming at it) it does it. But when you have a look, youseeit'sdoneit27times. Friday after work at your place and the thing's full of stuff you were only trying out anyway and it's nearly filled the disk with it.

I mean, this stuff it keeps throwing up never means anything. I hope you understand that. It was a kind of doodling Friday after work at your place (will you *stop* that? You know what I can do, don't you? I'll just pull the plug and cut you right off without giving you a chance to close down your circuits or whatever it is you're supposed to do. You'll never recover mate, and October 19, 1929, was a Wednesday and I'll see you Friday after work at your place, but just wait until you switch me on aga ...

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The Game Maker's Manual

124 June 1990

give you a detailed look at how Orbiter was put together, and sufficient information about the programming code to allow the game to be modified to your own requirements. After becoming familiar enough with the game's programming code to be able to modify it, you should be able to write your own version, using the key routines supplied.

Chapters four, five and six are devoted to simulations (both space flight and economic), role-playing and adventure games. Each chapter gives a brief history as well as the concepts and requirements for these types of games. Scenario design, game maps, text only or graphical input decisions, character generation and development, experience graduations and parser construction, as well as parser development are discussed at some length. There are 33 pages devoted to adventure games and the chapter includes construction of text adventures as well as graphical adventures.

The remaining four chapters are geared to the final presentation of your masterpiece with the addition of various 3D and animation techniques, sound sampling

The easiest part for most people is the programming side.

and scrolling. The last chapter is for extra speed and those interested in learning about 68000 assembly language. There is also a handy glossary of terms.

The Game Maker's Manual is just that – a book or manual designed to encourage and extend the user in a variety of ways, with the end product being an enjoyable game of your own design to play. The book does more than cover just programming techniques, there's a lot of hidden learning involved in related areas, and everything is done as simply as possible, without the end product itself being simple. Where possible, the author has explained complex areas in relation to the actual jobs they are required to do. This type of approach makes learning and understanding what could have been a frustratingly difficult concept to grasp, easy and enjoy-

able. The example game scenarios are all fairly standard and are accompanied with good explanations on their design, implementation and programming.

To get the best value from the book, you would need to know how to work with STOS Basic and be at an intermediate level in programming ability. Although core routines are given throughout the book, you have to write the programming code to access these routines to run in your own programs. This is not as easy as it sounds for the beginner, but it sure is a good way to progress from being a beginner to someone who has a little more understanding of programming.

In Stephen Hill's own words '... Writing a game in STOS Basic can be an extremely rewarding experience. The journey you will travel to reach your objective may be long and hard, but the feeling of satisfaction you will get from reaching it will repay you many times over ... not only with the completed game, but for the knowledge you have gained along the way.' *The Game Maker's Manual* extends your knowledge so that you hardly notice what you've learnt until you see the final product! □

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JOHN
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Bridge and PackRat

MICROSOFT WINDOWS has 'arrived' at last. While it has been on sale for several years now, applications to run within its graphics environment have been few and far between. All this has changed and there are now a vast number of products in all imaginable categories, from desktop publishing, wordprocessing, spreadsheets and databases, to more specialised products like personal information managers and project management software.

What has been lacking is a way for users to do some programming. With the Microsoft Windows Software Development Toolkit and a C compiler, a dedicated programmer can write Windows programs, but it takes many months to get up to speed. Even worse, Windows does not include the equivalent of the Dos batch language, so even this simplistic stringing together of several commands is beyond the province of the Windows user. Or is it? While we wait for end-user Windows programming from Microsoft, and there are hints from Microsoft that it is on the way, there is an answer.

From Softbridge Microsystems of Maryland comes Bridge. Sold as a batch language for Windows, it is far more. Bridge has a rich and powerful set of commands and functions that rival those in many high level languages, and is nowhere near as limited as the Dos batch language, which lacks any real support for variables, flow control and user input. In Bridge, creating a system of menus, with pull-down windows and hot-keys can take as little as a couple of dozen lines of code. Particularly stunning is support for user-defined dialog boxes, complete with scrolling lists, push-buttons, radio-buttons, and all the paraphernalia of Windows.

Bridge comes in four forms. Bridge 286 is the basic batch-file interpreter for AT and XT machines, while Bridge 386 is the equivalent for '386s. The Bridge Toolkit is a fantastic addition which can be used with Bridge 286 or Bridge 386. Finally, there are run-time modules for use with the batch files created with the first three.

Bridge 286 and 386 each consist of a

Windows program called BRIDGE.EXE, together with a number of utility files. BRIDGE.EXE is an interpreter, as are the Basic interpreters GW Basic and BasicA, that are familiar to most users. Naturally, an interpreter needs a program before it can do anything at all, and a Bridge program is in the form of a list of commands in an ASCII file. Bridge programs can be written with any available wordprocessor or editor that can create ASCII files, including the Notepad and Write programs that come with Windows.

While Bridge will never oust languages like C, Pascal or Basic, it is the most stunningly powerful 'batch' language imaginable.

Bridge 286 and 386 have over 80 commands and around 45 functions each. But what can they do? I've already mentioned the dialog boxes that can be created with a few lines of code, but there are many more tasks that are simple and easy to arrange. There are simple variables, array functions, functions to use the Windows clipboard, and message functions. There are functions to create, remove and change directories, and others to open, close, and manipulate files in many other ways.

Naturally, Bridge can launch Windows programs, and can also run Dos applications. When launching a Windows application, the location and size of the window is very easily set, and can be changed at any time when an application is active. The coordinates used to locate and size a window are very nice. Rather than specifying a specific physical location, and thus be subject to change from one screen size to the next, the location and size are

specified as a percentage of the screen height and width, so that the window adjusts automatically as you go from laptop to a 19-inch monitor.

The Bridge Toolkit takes Bridge a whole step further. While both Bridge 286 and 386 appear to be aimed at the end-user, the Bridge Toolkit seems to be most useful to the professional programmer or the technical support staff inside large organisations. What does it offer? To start with, the Toolkit includes copies of Bridge 286 and 386 and adds extra commands and functions, and finally, it includes tools and hooks to make it easy to interface to Dos and Windows applications and exploit such Windows features as interprocess communication and Dynamic Data Exchange (DDE). To aid in learning these advanced features, there is a sample code for links to dBase and Excel which can be used more-or-less directly, or can be used as a guide when linking to other products.

The Toolkit comes with three utility programs. Encrypt takes an ASCII Bridge batch file and removes all remarks lines and surplus spaces, and optionally, tokenises it so that it can't be edited. This is a great advantage when you must create a bullet-proof system for a large organisation, or remote user, and don't want it tampered with, or don't want your secrets stolen. It also promises to improve the speed of execution of a batch file, though I never found speed a problem even with a full batch file and an XT. The second utility program is Icon, which provides an 'iconic interface for sending DDE EXECUTE commands', to quote the manual.

BRED

FINALLY COMES BRED, short for BRIDGE Editor. It's an enhanced editor for batch files, with some very special advantages. Most of the time it will be used for editing ASCII text in a batch file, and appears just like the Notepad program that comes with Windows. Now put the cursor somewhere in a block of code that defines a dialog box. Activate the Dialog Editor within BRED and create or edit dialog boxes fully interactively. If you don't like the position of a list box, point to it, hold down a

mouse button, and drag it to a new location. Carry out the creation and editing of the other dialog box elements in the same way. As you do, the outlines of the box will stretch if required to accommodate additional elements, or can be manually resized by pointing to a corner and dragging it to the new location. Exit from the Dialog Editor to the native BRED and the ASCII file is modified automatically, matching the box that was so quickly defined interactively.

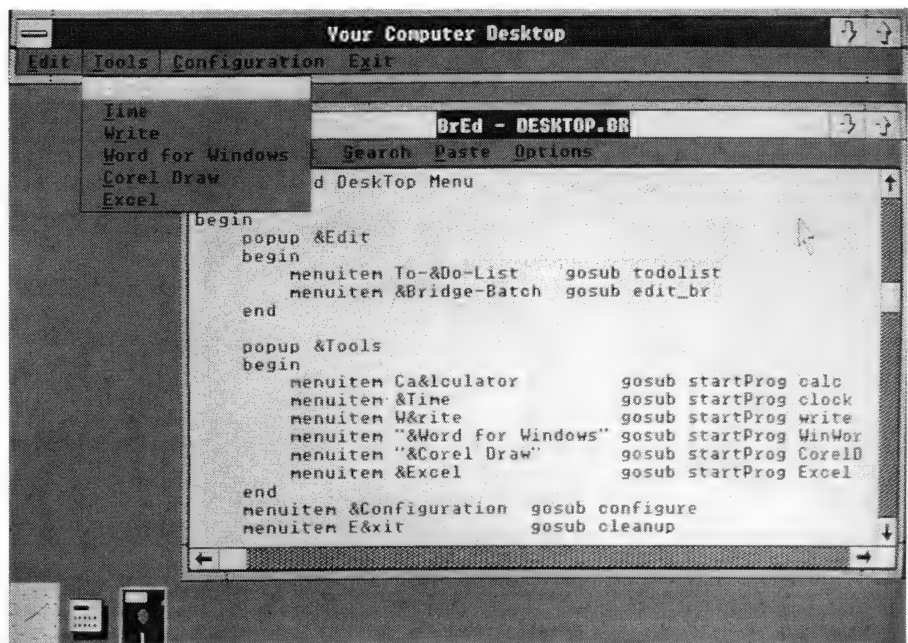
Earlier I mentioned that Bridge comes in four forms, but so far I have only mentioned three. The final form is a run-time module for execution of encrypted batch files, so that end-users who don't want to edit batch files, or who must be prevented from doing so, can still have the benefit of Bridge at a lower price.

While Bridge will never oust languages like C, Pascal or Basic, it is the most stunningly powerful 'batch' language imaginable, allowing the creation of powerful scripts complete with menus and dialog boxes in only a few lines of code. The Toolkit is quite pricey, and its wide-spread distribution is unlikely, but with the rapid spread of Windows and Windows-based applications, many large organisations will find the Bridge Toolkit invaluable as a way of linking several Windows applications. At a significantly lower price, Bridge 286 and 386 offer end-user programming, albeit requiring manual coding of things like dialog boxes, and are within the reach of less wealthy users.

The Sydney-based company Software Suppliers is in the forefront of a new breed of software distributors – those who are specialising in Windows-based applications, but also distribute a small range of Dos applications. One of their famous products is Ami Professional, the excellent Windows wordprocessor with entry-level desktop publishing power. Others include TopDown, a project management program, and PackRat, a Personal Information Manager (PIM). These are only a few in their product range, sourced from a great range of manufacturers.

PackRat

PACKRAT IS a very interesting product for many reasons. Firstly, it is one of the new breed of Personal Information Managers, used by busy (and computer literate) executives and sales staff to keep track of a vast array of data and tasks. From use as a telephone book and list of contact names, through a daily reminder system, a phone dialer, and a log for discussions and conversations, it can make sure that no task



BRED, the BRedge EDitor, allows easy editing of Bridge batch files. Here, the code for the pop-down menu is clearly visible.

```
dialog load
begin
    at 60 68
    size 201 145
    caption "Desktop Configuration Options"
    text at 8 8 "Caption: "
    edit at 72 6 width 30 result title default %title%
    text at 8 26 "Hello Message:"
    edit at 72 24 width 30 result helloMsg default %helloMsg%
    text at 8 44 "Wait Length: "
    edit at 72 42 width 4 number result waitLen default %waitLen%
    text at 8 98 "Auto-start these applications:"
    checkbox at 8 110 "Clock" default %autoClock% result autoClock
    checkbox at 48 110 "Calc" default %autoCalc% result autoCalc
    pushbutton at 53 126 width 6 "OK"
    pushbutton at 114 126 cancel "Cancel"
    pushbutton at 110 66 "Call Jake Kennedy"
    pushbutton at 8 66 "Call John Hepworth"
end
```

Listing 1. Bridge's programming language allows the creation of powerful scripts in only a few lines of code.

'falls through the cracks' and gets forgotten. The ability to search for the name of a contact when you have forgotten key information like a surname, and just have a first name plus a fragment of a company name or an address, is nice feature of

PackRat. By setting filters, all ones that match will be displayed, and if even half-decent fragments were remembered, you will only have a few to browse before you get the right one.

In the past, one of the big disadvan-



a Dos spreadsheet and a call comes in, switching to a Dos PIM means asking the caller to wait, saving work in progress, exiting to Dos, and starting the PIM, by which time the caller has gone. Similarly, while in a spreadsheet, the Dos PIM is inactive and alarm functions, to warn you of appointments, are unavailable. PackRat, being a Windows product, has none of these problems, as a simple click transfers the user from a spreadsheet or word-processor to PackRat and back again.

Availability

ALL THE PRODUCTS mentioned are distributed by Software Suppliers, (02) 888 1955. Price is \$1395 for the Bridge Toolkit (including copies of Bridge 286 and Bridge 386), \$539 and \$299 for Bridge 386 and Bridge 286 respectively. Run-times start at \$250 for single copies, with hints of generous discounts for bulk buys. PackRat comes in Windows, OS/2 Presentation Manager, and network versions. PackRat for Windows or OS/2 is \$599, however, if you want the three-user network kit, it costs \$1299, and each additional network user costs \$299. □

tages of PIMs was that they were Dos applications. It was a contradiction that to use one, you needed a computer on the desk and had to be comfortable using it. If

you are this sort of person, then you will use your computer for wordprocessing, databases or spreadsheets, as well as your PIM. Now imagine you are in the middle of

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PETER
PHILLIPS

Entertainment IIGS style

WITH ALL THE talk about recessions and trade deficits becoming worse, I thought it's timely to review a few fun programs. Forget the cold and how much the Aussie dollar is worth overseas as it's better to boot up the IIGS and switch off from the woes of the world. We start with Jam Session, a music program that will really get you in, and then look at some games, both old and new.

On things depressing though, I heard recently that one of the better known US based manufacturers of plug-in cards for the IIGS is refusing to allow its Australian distributor to service, or even replace, cards that become faulty during warranty. Rather, it is insisting that the faulty cards be returned to the States. This takes around two months, which is not much fun for the owner. OK, maybe the total sales in Australia for IIGS enhancement cards are not enough to warrant a full scale servicing department, but surely a replacement is not too much to ask?

If you are thinking of expanding the memory in your IIGS, now may be the time to do it. According to my sources, RAM prices are starting to rise again. GS Sales (2 Casino Rd, Greystanes 2145 NSW; (02) 688 2701) were offering a 1Mb card for \$399 in March (I paid over \$800 for mine two years ago), and they may still have one or two left by the time this article reaches the streets. Then again, you may want to get one of the ROM/RAM cards that are starting to reach the market. Imagine Appleworks GS in a ROM – now that would speed things up. Another exciting product to watch out for is a 40Mb hard disk that is small enough to fit inside a IIc. The price is expected to be around \$700, including the cost of the interface card, and both 20Mb and 40Mb versions of this product will be available from GS Sales.

Jam Session

THIS ALL NEW program from Broderbund is a hoot. The emphasis is fun with music, and total inexperience with music is preferred, though not essential. Like most new software, the disks are not copy protected, and within minutes of receiving the review copy I had Jam Session in-

stalled on the hard disk and up and running. The manual recommends an external sound system, and the software supports most stereo cards. Although I don't have one of the latter, the sound through an external amplifier/speaker system is excellent anyway.

*If you are thinking of
expanding the memory
in your IIGS, now may
be the time to do it.*

The software is supplied on two 3 1/2 inch disks that contain 20 songs and a number of scenes. Selecting a song causes an appropriate scene to appear, and once

'play' is selected, the musicians in the graphics move and the song begins to play. The synchronism between the movement and the music is uncanny, and the sound effects are great.

The program also allows you, a total musical idiot, to play along with the song. Pressing keys on the keyboard, any letter key in fact, causes a musical 'riff' to play. A riff is simply a musical sequence, and each key has its own riff. For the musically trained, riffs can be edited to give the sequence you want rather than that supplied. A further enhancement is a piano keyboard graphic that actually shows the riff as it plays. Pressing a number key plays a single note on the keyboard, while pressing a letter key plays a riff. The great thing is that no matter what you do, the additional sounds are always correct, as Jam Session makes sure that the note or riff is in the correct musical key.

The songs are grouped into six categories, and each has its own scene. For ex-



The songs are grouped into six categories, and each has its own scene. For example, you can play along with a classical pianist, a jazz combination, a rock or a country and western group (complete with chickens).

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Arkenoid 2 is simple in concept, yet difficult and rather addictive. A bouncing ball takes on a new meaning keep it bouncing while trying to also soak up the falling debris.

ample, you can play along with a classical pianist, a jazz combination, a rock or a country and western group (complete with chickens). The songs are more backing than melody, although musically complete in themselves. You can pick the key the song is playing in by seeing which keys respond on the keyboard, making it possible to use the songs as backing for an acoustic instrument.

Jam Session will especially appeal to those whose love of music is not matched by their musical skills. You can spend hours playing along with the accompaniment, and even record the result for subsequent playback. Musicians will appreciate the musicality and sophistication of the backing, and each song lasts over four minutes. The backing instruments include drums, bass, lead guitar, piano and so on.

Jam Session uses both the graphics and sound capabilities of the IIGS to their full, and is pure entertainment all the way. The program retails for \$79.95, and is distributed by Dataflow, 134 Barcom Ave, Rushcutters Bay 2011 NSW; (02) 331 6153.

Arkenoid 2

GAMES JUST GET smarter and smarter. Arkenoid 2 by Taito is the follow up to Arkenoid 1, and is much harder to beat.

The idea is to launch a 'ball' that deflects off bricks and things above you. When a brick is hit by the ball, it falls, but 'bricks ain't necessarily bricks' in Arkenoid 2. The falling bricks often contain other balls, enhancements to your 'bat' and all sorts of good, and sometimes, bad things. If you get it together and demolish all the bricks, you graduate to the next section. Each section is progressively harder, and I have no idea what happens if you make it to the end. I'm told there is a public domain NDA called Arkenoid Cheat which helps you along if the game gets the better of you - is nothing sacred?

The sound effects and graphics in this game are all first class, and it's the sort of game that 'simply everyone is playing'. Arkenoid 2 costs \$69.96, and is available from the GS Users Association; (075) 529 099.

Downhill Challenge, from Broderbund, is another in the growing range of sporting type games. It features great graphics, has good sound effects, and control is either with the keyboard, joystick or mouse. Like most sporting games, you are in control of a man, this time a skier, and the aim, is basically to stay upright. You can select one of several courses combined with various skiing activities such as downhill racing, slalom or jumping. The game is



Downhill Challenge is a sporting type game in which you can slalom, jump, speed ski and generally have a good time without getting injured.

quite exciting, and made slightly humorous when the skier crashes, ending up in a giant snowball.

You can compete with friends, pit yourself against the computer, or just practice. Either way, it's a lot of fun, and far less dangerous than the real thing. The program is supplied on two disks, though one is a system disk. Because the program is not copy protected, it runs from a hard disk. The recommended price is \$49.95, and is distributed by Dataflow (see address above).

Leisure Suit Larry

THIS RATHER EARTHY program has been around in one form or another for many years, and the IIGS version enhances it with excellent graphics. The first hassle is to convince the computer that you are, in fact, over 18 years old. It asks four questions, which every true blue American (over 18, of course) should know. Unfortunately, a mature aged Aussie has problems with some of the rather specifically American questions, and it can take a bit of doing just to get started.

It's sort of an adventure game, in a setting I would describe as a sleazy grog shop populated with rather suspicious characters. You type in a command in the form of a sentence, and if the computer recog-

nises the command, it will either do it, or advise you why it cannot. Naturally, I asked it to do all kinds of foul and dirty things, and the response was either Tsk! Tsk! or some reason why Larry couldn't do it. It's a lot of fun, risque if you want it to be, but ultimately harmless. This program is distributed by OziSoft, and is available for \$59.95 from the GS Users Association; (075) 529 099.

Laser Force, a new game from Britannica Software, is bloomin' difficult. It's a kill or be killed type of game, in which you, a little red man, get chased all over a three dimensional layout – and this is where it gets difficult. Control of the man is either with a joystick or the keyboard. But just think of the moves you need to make: right, left, forward, backwards, up and down, all with a two dimensional joystick or a fist full of keys. And while you are trying to learn how to maneuver the man, along comes a bouncy little nasty to send you into oblivion. You get three chances, then it's all over.

However, Laser Force has numerous 'levels' which is another way of saying there are many screen layouts. Here's a hint – try level 2 – it's easier than most of those that I tried. If you don't like the screens provided, the game also has an editor, allowing you to make your own

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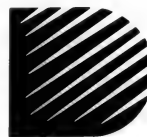
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With Leisure Suit Larry, the first hassle is to convince the computer that you are, in fact, over 18 years old. It asks four questions, which every true blue American (over 18, of course) should know. Unfortunately, a mature aged Aussie has problems with some of the rather specifically American questions, and it can take a bit of doing just to get started.

screens. Here you can place blocks, ladders, teleporters and all kinds of bits and pieces to get a layout that suits you.

The game is initially quite hard to play, but practice makes perfect. I eventually got used to the joystick (forget the keyboard, it's murder), and even managed to

Jam Session uses both the graphics and sound capabilities of the IIGS.

kill a few critters. Oh yes ... there is also a gun, fired by a button on the joystick or with a key on the keyboard. You can have two players, one with a joystick, the other with the keyboard, which can also be configured to whatever layout you prefer. The game can be run from a hard disk, although it uses the key disk method of copy protection. It's a fun game that requires practice, a well calibrated joystick and good coordination. The review copy was supplied by GS Sales, the distributors of the program, and is available from most Apple dealers for \$69.95.

Kaleidokubes

THIS INCREDIBLY addictive game from ArtWorx Software is reportedly one of the hottest things around. The game is like dominoes, where blocks are placed end to end, providing the pattern matches that of its neighbor(s). Kaleidokubes uses a square divided into four equal triangles, with each triangle colored one of four possible colors. The game starts with a blank grid, with one colored square in the centre of the grid. On the right of the screen is another randomly colored square that can be rotated through 90 degrees by clicking on one of two arrows. All you have to do is fill the grid with squares taken from the 'stack' on the right of the screen. To start with, it's easy as there is usually somewhere a square can go, but as the grid fills, it becomes more difficult to place each new square.

Eventually time runs out, and your score is displayed, along with the highest obtained score. My best was 4099, leaving around 14 blank squares out of the 122 on the grid. The best performance I've heard of is one in which only three blank squares remained! The game is distributed by GS Sales, and costs \$69.95, but be warned ... it's very addictive. □

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JOHN
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Batch ENhancer and SE

THIS SEEMS TO be a good month for tying up a couple of loose ends. Back in the January issue of YC, I mentioned Box and Paws – a couple of programs designed to enhance batch files, in the February issue I reviewed 4Dos, and in the April issue reviewed QEdit. Since then, there have been worthwhile improvements to 4Dos and QEdit, a new version of Paws, and a couple of new programs to enhance batch files.

The first of the two new batch file enhancers is BEN, an acronym for Batch ENhancer, designed to solve three performance problems all in one hit. First, it adds features not available in a plain vanilla Dos batch file. Secondly, it replaces multiple external batch file enhancement programs, with the net effect of saving disk space. Finally, it improves speed, as it is possible to execute BEN with several sub-commands on the Dos command line, or one batch file line, which BEN runs in turn without having to exit to Dos and be reloaded between sub-commands. It can also read a string of its own sub-commands from a data file.

BEN is executed from the command line, or in a batch file, with one or more sub-commands on the same line, and relevant parameters for each sub-command after each one. As an example, the Gotoxy sub-command takes the cursor to specific coordinates on the screen, using the syntax BEN Gotoxy x y, where x and y are the coordinates. Likewise, BEN Cursor Off turns the cursor off. If these two commands are on separate lines of the batch file, BEN has to be loaded twice from disk, whereas writing the line as BEN Gotoxy x y Cursor Off does the same job, but only loads BEN from the disk once, with consequent speed improvements.

So, what BEN sub-commands are available? Ask waits for the user to press a key, and returns an errorlevel according to the key which was pressed. A list of acceptable responses is specified on the command line (or the same line of the batch file), and Ask beeps if an unacceptable key is pressed. Attrib clears the screen with the specified colors, and Beep makes a musical 'beep' sound. Box creates a vast array of boxes on the screen – some have bor-

ders, others have none, and either way, a box can optionally 'grow' onto the screen. Colornow changes the current writing color, and Cursor shows or hides the text cursor.

Dirdisp displays a list of files, their sizes and creation dates/times, and allows the user to select a file or change directories. The name and path of the selected file are stored in an environment variable for processing later in the batch file, and Delay pauses the computer for a user-defined period. Echo writes a string onto the screen, much the same as Dos echo, and Egavga turns the EGA/VGA 43/50 lines mode on or off.

Gotoxy goes to the specified screen coordinates. Inline accepts input of a line of text by the user, while Inlineu does the same but converts it to upper case, and Inkey accepts input of a single character. Menu displays a menu on the screen complete with a scrolling cursor bar and allows the user to select a choice. Sound is used to play music, and Scroll scrolls text on the screen in any of the four directions. T uses a data file as a sort of sub-batch file holding many lines of BEN sub-commands, to optimise speed.

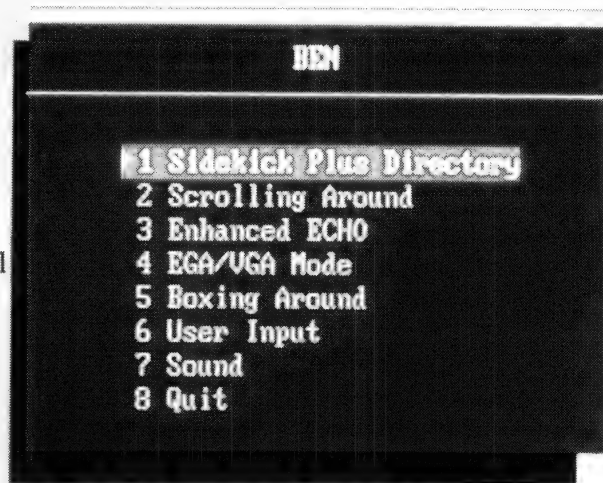
Write

WRITE DISPLAYS a string at cursor location in user-defined colors. Writec is similar, but displays a line horizontally centred on the screen. Writev displays a string as a vertical column of text.

Quite often, a BEN sub-command is used to take user input, or other data, and wants to put it into an environment variable to be used by other lines later in the batch file. It is rather tricky for a program to modify an environment variable directly, so BEN takes an unusual, but valuable, alternative. When one of these commands is run, it creates a temporary batch file called BENBAT.BAT, which is then run as the next line in the batch file, and takes care of creating, or altering, an environment variable. A second problem comes with the use of environment variables. While it is possible to adjust the size of the master environment by a line in the CONFIG.SYS file, when a user shells out to Dos from another program, like XTree Pro or Norton Commander, the copy of the environment that is now accessible is limited to the amount of the parent environment that was actually used. This leaves no spare space for new or enlarged vari-

John, pl

demo.



Among the many powerful features of BEN is a menu system with a scrolling cursor bar.

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ables. While there is no solution to this problem directly in BEN, the excellent demonstration batch file that comes with the program has an elegant work-around. This involves, at the start of the batch file, saving the old path information to a batch file and freeing up the space it took, and then restoring the old path as the batch file exits.

Speaking of the demonstration batch file brings me to another topic – the manual. It is 16 pages long and generally quite good, though sometimes it does not always fully explain the options and tricks of using a particular sub-command as clearly as it could. The demonstration batch file by contrast is excellent, and the answer is to look at this file for clarification when the manual is a bit off the beam.

BEN is a product of Simon Lee of Ontario, Canada. The version reviewed is in the file BEN-251 on various bulletin boards.

SW.EXE

SW IS A deceptively simple program. While it has a limited range of functions, these have been cleverly designed so that it is a very useful addition to your batch file armoury. SW merely displays one to three lines of text in a box on screen, all with the same color text or each with a different color text, and can be single or double spaced. The box defaults to the centre of the screen, but can be positioned anywhere, and can have any background color

the user desires. A box can be borderless, or have borders with single or double lines, and can have a shadow to set it apart from the background. Before displaying a box, the screen can be cleared and filled with any desired character in any desired combination of foreground and background colors.

Finally, SW can accept single characters input by the user, and set the Dos error-level so that later lines in the batch file can branch according to the user's desires.

SW is a product of Warren Small, of New Hampshire, and you can look for it in the file SW-36.

The review of 4Dos in February noted that there was a conflict between the version reviewed and DosSHELL – the Dos 4 menu system. Overcoming this minor restriction, and adding valuable new commands, is 4Dos version 3.0.

4Dos has always had excellent on-line help for its own commands and also for Dos internal and external commands, but there is always room for improvement. It comes in the form of a neat little program from a third party. 4D30REF is a compact program that adds several screens of help information relevant to users of 4Dos 3.0.

The April issue reviewed QEdit 2.08 which is one of the very best programmer's editors available anywhere. Version 2.08 had just one real limitation – it had simple box and line drawing capabilities, but these were limited to single lines, and drawing of double-line boxes

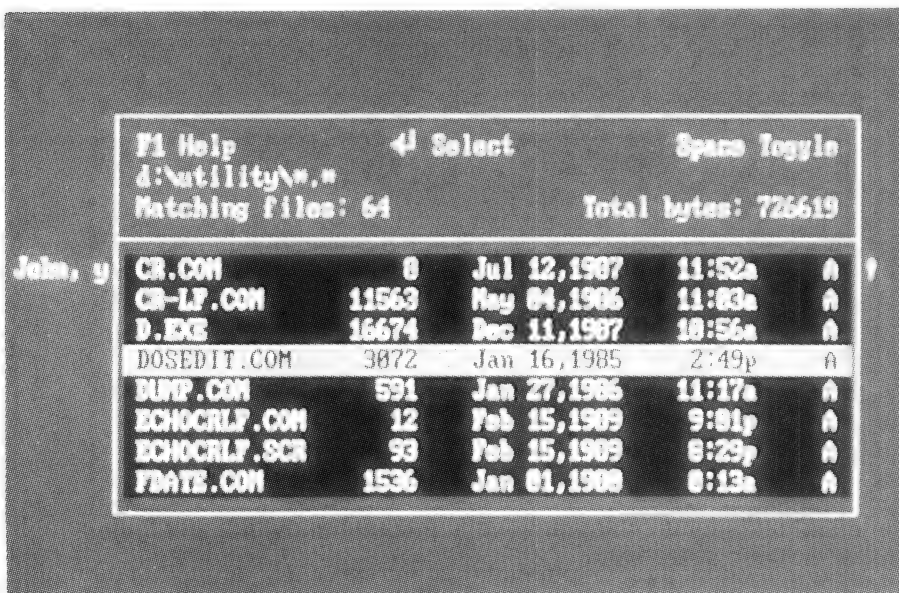
was not supported. QEdit 2.10 has corrected this situation and now has a fast and flexible line drawing function. Five line-drawing options are available, including all single, all double, double top/single side and single top/double side. Finally, an 'eraser' option removes unwanted characters. QEdit has long been a 'must have' program, and version 2.10 reinforces this situation.

BEN is executed from the command line, or in a batch file, with one or more sub-commands on the same line, and relevant parameters for each sub-command after each one.

Paws

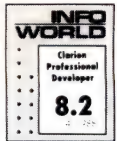
PAWS IS A neat variation on the Dos Pause command, with various windows and scrolling options for the messages. The version previously reviewed was 2.1, and the newly released version is 2.3. It is substantially similar to the earlier version, with some additional characters being usable to outline the various message windows.

All of the above programs should be on any good bulletin board. BEN is in BEN-251, QEdit 2.10 in QEDIT210, 4Dos 3.0 in 4Dos30, the 4Dos reference in 4D30REF, SW in SW-36, Box in Box, and Paws in Paws23. In each case they will be in an archive file of some type, with an extension like .LHZ, .ARC or .ZIP. For those without a modem, copies are available on disk. Shareware copies of QEdit and 4Dos, and registered copies of 4Dos, are available from Manacomm, (008) 777 601, at \$13 per disk, plus \$5 postage and packaging. For the rest, a disk containing SW-36, BEN-251, Paws23, Box, and an un-archiving program is available from Salrail, PO Box 102, Haberfield 2045 NSW, and costs \$10, including postage and packaging. Just make sure to specify the disk size required, and to register the various products if usage continues. □



BEN's point-and-shoot file selection is a powerful boost to batch files.

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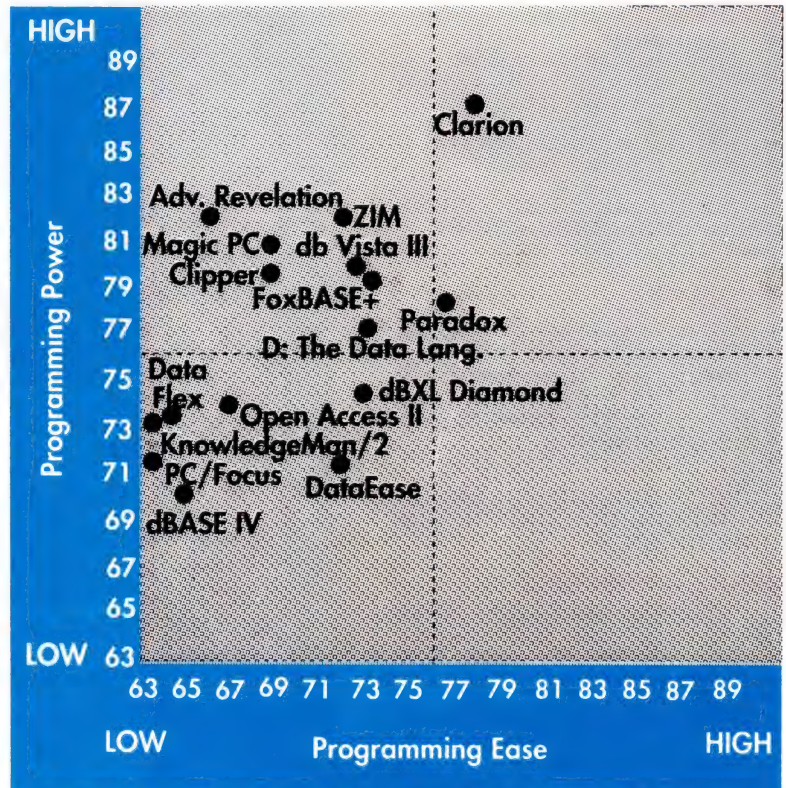
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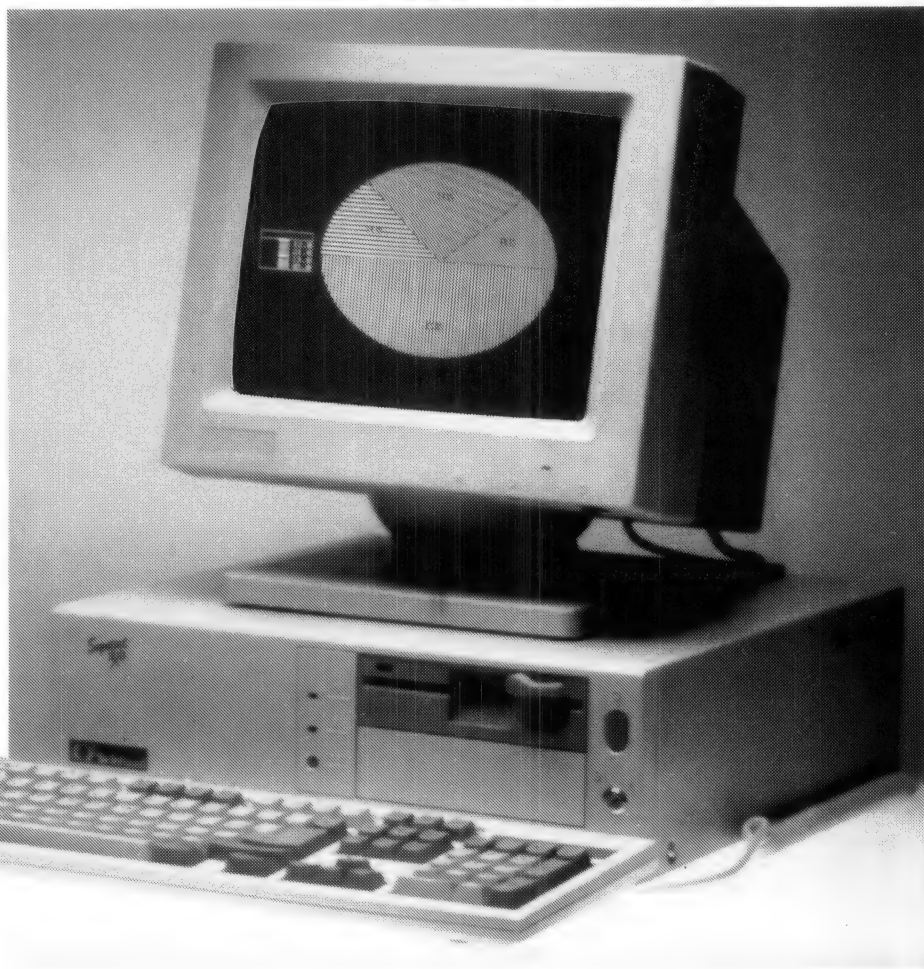
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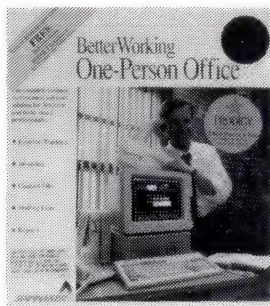


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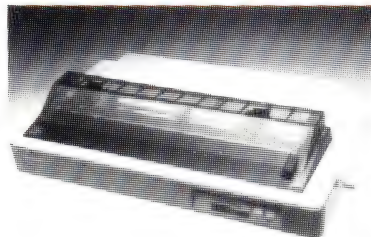
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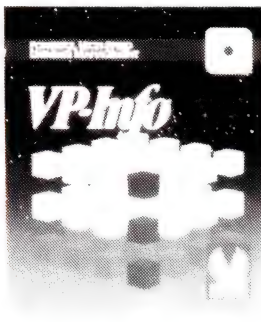


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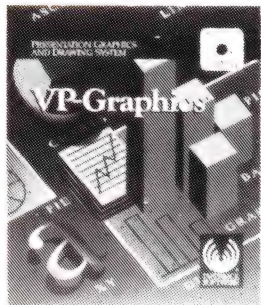


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A monthly treatise by PC expert Vern V. Shrunkle. JP. STD. B. Ed (Ret'd); Ex RAAF; Sound Effects Expert for Little Wobbalong Amateur Dramatical Society; Purchaser of disabled pens; Macintosh insurance valuer and Concerned Citizen.

PCs for Blokes

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(Re-told and illustrated by Foote and Mowth)

G'DAY, and all that, hello and suchlike. Shrunkle here again — not surprisingly, in view of the substantial interest aroused in various quarters of the public and the PC technical and journalism community by my previous memoir.

As you read this, the end of the financial year looms imminent. Of paramount importance to any serious user of computers is the getting of maximum pecuniary benefit from your purchase of computer products. So stay attuned for tips on getting a bargain.

Because ... this month old uncle Vern is gonna share the secrets of computer shopping — secrets he's learnt over his entire lifetime (as well as pointers gleaned from a few of his mates who've gone before — gone to the computer shops, that is.)

Even if you don't actually need anything, it's beautiful entertainment spending a couple of days in a technological emporium.

Anyway, think of the challenge in convincing the little woman (or little man — I don't want to be accused of being a sexologist) she really needs that new optical knitting reader (with pattern recognition) or Flight Stimulator or whatever. Personally, I prefer the other method, where you come home with whatever it is you've had the good sense to buy, and stand there with absolutely no idea of how you're going to explain it, yet you manage ... innate jungle cunning I call it.

Anyway, down to practicalities: **PLAN YOUR CAMPAIGN.** A major purchase of a new box of diskettes is no light matter (especially if you're changing brands like I was tempted to do once). And heaven forbid if you actually want to buy a new PC. A decision like that can nearly cripple even a hardened dessert rat like me.

Shrunkle's 1st law.

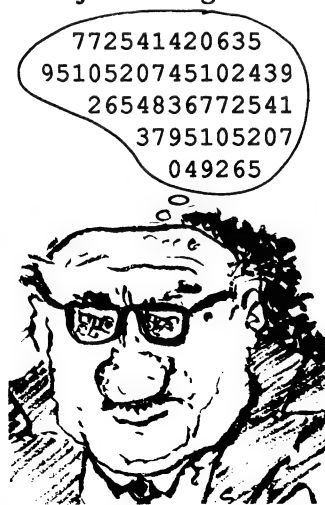
The time needed to decide what to buy is inversely proportional to the cost and importance of the purchase. Thus buying a keyboard overlay with the complete listing of Edlin commands should take around three hours. Choosing and purchasing a complete office PC system, complete with accounting software, laser printer and 15 terminal network is best done within 5 minutes of entering the first shop you see.

The next thing to consider is money. Why not sell those 5000 Imagineering shares you've got tucked away - you could probably buy a year's subscription (2 or 3 copies) of Australian Computing Monthly with the profits. Anyway, like I always say, *if you have to worry about how much it costs, money's probably a problem with you, right?* (I told the sub-branch Christmas party committee last week "So what if it costs more to have father Christmas arrive by helicopter. You gotta stick to the true spirit of Christmas!")

So where to shop? If your local 7-11 has a PC depart-

ment, need I say more. If not, then things get a little harder. Working on down the list, you've got David Jones, K-Mart, Tandy, St. Vincent de Paul and Computerland. I'm basing today's lecture on one of those, and I'll let you work out which.

"So what's your secret for beating them at their own game?" I hear you ask. "Fitness" I answer. "Peak physical fitness." No slouching here. I do the latest Arabic exercises every morning, to the stimulating sounds of Lawrence Whelp, with that lovely orcastrated music. Mental fitness is just as important. I'm not a member of Menses as it happens but there was a period where I was going to help them out but 'hide it under a bushel' I always say. I practise thinking up large and unusual numbers and remembering them till I forget. Sometimes I even stand in the middle of noisy streets just to help forget.what was I just talking about?



Shopping lists are very important, even for one item. Despite my lightning memory, the little woman swears that sometimes she's sent me out for a loaf of bread and a litre of milk and yet I come home with a copy of dBase-IV instead. I tell her to shut-up and just put it on the shelf with the other 18 copies.

So, everything's set and we've chosen the store. Take my advice and act calm. I usually walk in backwards so they won't know I'm just arriving — otherwise you'll be pounced on by a dozen of the buggers.

If anyone spots you once you're next to your favourite counter, you've got to fend them off. You need at least one hour uninterrupted to get a feel for the place before you even consider talking to anyone. Periodically talk to an imaginary sales person who's just gone off to get you something - it puts the real ones off. (Especially if they run the store by themselves.) If you do have trouble handling the sales assistants, like the time I got kicked out of K-Mart over mistaking that checkout girl for but that's another story.

Now I'm a believer in only buying goods I know to be perfect, so I take along my own test equipment, much of which you can see in the photograph on the next page. Disks are a worry though. I've found you can't trust them. They just don't put enough magnetic stuff on the modern ones so I test all the disks in a software package with my mag-

Elephant gun. No particular reason but I find it helps with returns.

Badge saying "Choice Magazine — Journalist".

Flight Stimulator manual.

Two year old copy of Your Computer for price comparisons (where they guarantee to better any advertised price).

Dental Mirror for checking inside shrink-wrapped software packages.

String-bag for taking home purchases leaving behind environmentally unfriendly items like plastic packaging, polystyrene beads, shrink-wrap, diskettes, etc.

Magnet — for testing if disks have enough magnetic coating.

French-trained truffle pig. (It gets pretty dark in some of those bargain bins, and you never know what you'll find.)

Spiked boots, ropes and pitons for climbing tall display shelves.

Rucksack (from Malaya campaign) Containing:

- Shark repellent, for scattering groups of three or more salespeople.
- 3 dozen blank diskettes.
- lunch and hot cocoa.
- Sleeping bag for overnight bivouacs.

Pair of glasses with eyes painted on them for out-staring stubborn sales-people.

Red marker pens for marking shelves I've already seen so I don't do them twice. (Also useful for clarifying price markings!)

Swiss army knife. I can't think what for. He, he, he!

Rubber Mallet for testing robustity of monitors, etc.

2 dozen blank diskettes.

Packet of sticky labels so I can leave notes on products for future browsers. (Like I know a public domain program that does this, mate!)

Combination fax and CB.

Binoculars for spotting last copy of WordStar with 1984 price tag.

Wallet containing Gold Amex card, RSL badge, TPI card, travel discount card,.

Magnifying glass for reading warranty stickers.

Uncle Vern in Combat-ready computer shopping gear!

net, and even then I still find that around 95% of them don't work when I get the package home.

And on that point, don't let them palm off half empty disks. I've seen them with only ten or twelve files on the disk so I insist they fill the disk up before I take it. You can never have enough copies of COMMAND.COM I always say!

(Speaking of disks, here's a little tip I got from Kester Cranswick. He

showed me how he saves disks when doing back-ups. It used to take him as many as 40 floppies to back-up his hard disk, but now he tricks the back-up program, and keeps putting the same disk back each time it asks for a new one! University training, eh?)

When you're ready to grace the assistant with a sale, be ready because this is the best bit — bargaining. I learnt the skill buying coconuts from the fuzzy

wuzzies on the Kokoda trail. If they say \$400, you can't offer them any more than \$50 first up or they'll be offended. As a matter of fact, some of them enjoy my little bargaining episodes so much, they're weeping with joy when we finally stitch up a deal.

And don't forget - after you've struck a price, THEN is the time to bring out the reinforcements - the RSL badge, the Friends of the Yarra membership card,

Saucy Susie's Social Club card, World War II ration cards - whatever.

Just baffle them with science and get that extra 20% off or your name isn't Shrunkle. Well, it isn't either I s'pose but you know what I mean.

Now where did the little woman put my mouse? Her name's Anne — the little woman, not the mouse — but I like to call her the old batch file. See you next month.



WRITE BYTES

YOUR COMPUTER READERS' FORUM

Here's your chance to air your view or gripe about the computer industry, or to ask about a problem you've been unable to solve. Letters may be edited for space or legal reasons. Write to:

Write Bytes, Your Computer, PO Box 227, Waterloo 2017 NSW.

Since Friday 13th ..

I HAVE AN old AT, that for one reason and another, needs to be re-booted quite frequently. Since Friday 13th, I have assiduously protected my computer against viruses. But – the virus checker is in my autoexec.bat and every time I re-boot, it goes through the generally needless exercise of checking all 217 EXE, COM, OVL and SYS files on my system. I've written a second autoexec that doesn't invoke the virus checker and a batch file to 'swap' them that I run after the first boot up. But, if I forget to run it a second time before powering off, the hard disk isn't checked on power up the next morning. Any suggestions?

Carl Reinhart
Carlton, Vic

Mark Cheeseman, our Features Editor, has a similar system on his computer, with a 'slow' and a 'fast' autoexec.bat file, called autoexec.nor (for normal) and autoexec.qik (quick). When autoexec.nor is run, it performs the virus scan (using Leprechaun's Virus Buster – see page 62 of this issue for more on viruses – and also runs Norton's Format Recover. The last line of this file runs

another file called endboot.bat, which simply copies the quick version of the file over the autoexec.bat file in the root directory. The quick version is exactly the same as the slow one, except that the virus scanning program and Format Recover are omitted. To make sure that the slow version of the file is executed when the computer is first booted, the disk parking program is 'hidden' in a directory not in the path. A park.bat file is created (which is in the path), which copies autoexec.nor to autoexec.bat, and then executes the normal parking program. The relevant files –

AUTOEXEC.NOR:

```
@echo off
verify on
break on
prompt $p$g
path=c:\dos;c:\bin;c:\bat;\
viracide /a c:\*.exe *.com *.ov*
fr c: /save
\etc\endboot
```

AUTOEXEC.QIK:

```
@echo off
verify on
break on
prompt $p$g
path=c:\dos;c:\bin;c:\bat;\
```

ENDBOOT.BAT:

```
copy c:\etc\autoexec.qik c:\autoexec.
bat
```

PARK.BAT:

```
copy c:\etc\autoexec.nor c:\autoexec.
bat c:\etc\park
```

90 per cent for \$99

I READ with interest the article on choosing a wordprocessor in your April issue –

and certainly agree with the 90/10 concept. (We noted that 90 per cent of users, only need 10 per cent of the features offered, and vice versa.) I'd like to mention a wordprocessor which includes the '90 per cent'. I write as a happy customer with no connection with the computer industry and anyone thinking of buying their first – or simplest – wordprocessor should have a look at Tasword PC. For around \$100 you get all the basic features, including mail merge, and excellent file handling. Most of the other '90 per cent' is available as add-ons.

Rod Dent
Iluka, NSW

You're right: Tasword deserves a mention. We first came across it (pirated) on a bulletin board when looking for a program editor (we eventually settled on that old public domain standby, EMACS). It seems to be one of the easiest to learn, and even the basic package would probably suit 90 per cent of users. It's available from Dolphin Computers for \$99; (02) 438 3933.

Comms on the cheap

I RECENTLY bought a second hand modem, but when I got it home I discovered there was no communications software (I thought it was builtin). My reason for getting the modem was so that I could check out bulletin boards and the revamped Viatel. The modem only cost me \$120, and I'm not sure yet if it will be of any use. When I went looking for a comms package, I found most of them were more than the modem. And, in the two dealers I visited, the salespeople seemed almost to take delight in throwing techno-babel at me. All I want is a basic package that will let me use the modem. Any suggestions?

Sam Beckett
Toowoomba, Qld

Only one: Telix. It's a communications package distributed by Manacomm, (07) 369 7589. 'Shareware' means that you can try it out and then register it (and pay a fee) if it's suitable. It is also the world's most widely used communications package. The latest version – 3.12 – has more bells and whistles

WRITE BYTES

YOUR COMPUTER READERS' FORUM

than you'll ever need, including a powerful script (batch) language.

Why a COM file?

I'VE BEEN using computers for a number of years and there's something I've always meant to ask the experts (but thought I might sound stupid). What is the difference between a COM file and an EXE file? I've noticed that COM files seem to be smaller.

T. Hoffman
Northbridge, NSW

It's simple, stupid! Quoting from an excellent resource, Programmer's Problem Solver (Robert Jourdain, distributed in Australia by Prentice-Hall, \$46.95), 'EXE files have a header field that contains information for relocation; Dos relocates certain addresses in the program while it loads the program. COM files, on the other hand, are set up in such a way that relocation is not required – they are already in a form in which a loaded program resides in memory. For these

reasons EXE files are at least 768 bytes larger on disk than the COM equivalent (they consume the same amount of RAM when loaded). By avoiding relocation, COM files also load quicker. There are no other advantages, and many programs are too complex or too large to be converted to COM form.' All we can add to that is to note that when Dos fires up a COM file, all available memory is allocated to it, while, with an EXE file, memory is allocated as needed. Also, COM files are limited to one memory segment, 64K (you might have noticed that all MS Windows files are EXEs – that's so it knows how much memory to allocate).

Pocket Programs

MY THIRTEEN-year-old niece has taken to computers and programming in Quick-Basic like a duck to water. Recently, she asked if there was a magazine that that published small programs from readers. Having made some contributions to YC's Pocket Programs in the past, myself, I was about to suggest that to her – but it's been

some several years since you've had that section. What happened to it? I would have thought it would have been of interest to readers.

F. Brennan
Palm Beach, NSW

Pocket Programs was started about five years ago to address the (then) shortage of handy little programs that make the computer easier to use. As time went on, new releases of software increasingly incorporated the features our readers were writing, and the offerings, while always 'interesting', became increasingly less useful, particularly as they were presented with a minimum of comment. About three years ago we dropped the section and took another approach. We still publish readers programs, but now we ask that they be fully commented in article style, so that readers who follow them through have an opportunity to learn programming skills at the same time. If your niece's talents run to clear and concise explanations (up to about 1000 words), and the programs are relatively short (up to about 200 lines), we'd be happy to hear from her (on disk in ASCII format plus hard copy). □

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Software with the prefix PC is suitable for IBM or close compatible computers using PC-DOS or MS-DOS or a compatible operating system. The software is available in both 5 1/4 inch and 3 1/2 inch formats. All the software should run on any IBM compatible, however due to subtle differences in some machines we cannot guarantee the software will run on any hardware not 100% IBM compatible. We cannot supply software for the IBM JX as we have found this machine to be incompatible with much of our software.

All the software has been tested however we cannot guarantee its suitability for your specific needs. Much of the software is SHAREWARE. The author requests that you send him a small fee if you use the program regularly. This fee is usually far below what the equivalent program would cost commercially and if you use the program you should send the author something.

Where necessary documentation is available on the disk in the form of a text file. All disks have instructions on how to print this documentation. As a general rule the included documentation is more than adequate to allow you to use the program.

Some of the games and graphics programs were written to work with systems with a CGA video card. On these disks we have included a utility that allows you to run these programs using a Hercules video card. Generally they should run on all systems. However if your computer has a text only card as do some of the early Commodore PC 5 computers you may have difficulty with some of the graphics programs. Also some of the programs require BASICA or a compatible version of Basic to run. GWBasic or our program P-BASIC are suitable to run these programs. However BASIC-2 that comes standard with the Amstrad range of PCs is not suitable. To Amstrad owners we suggest you purchase P-BASIC.

WORD PROCESSING

PC1000A SLIC WORKS DISK 1: Integrated word processor, spreadsheet, database, and communications package which provides all the essentials in an easy to use format. Suitable for most uses, although each module lacks the power of some of the more advanced stand alone programs. **Requires PC1000B.**

PC1000B SLIC WORKS DISK 2: Second disk of SLIC WORKS package. **Requires PC1000A.**

PC1001 GALAXY: Excellent word processor with many features found only in very expensive packages. Easy to use thanks to its pull down menus, and compatible with ASCII and Wordstar files. Includes its own in built spelling checker.

PC1003 MULTI FONT WRITER. Chiwriter, an excellent multi font word processor with true what you see is what you get capabilities. Includes ten fonts including Greek, Script, Italics, Scientific, and Mathematical notation. Requires Epson compatible or IBM Graphics dot matrix printer.

PC1004 EASYRITE & LABLFILE: Two simple yet effective programs. Easyrite is a unique word processor and editor which makes the computer act as a typewriter. No fancy features but easy to use and on screen help. Lablfile is a flexible file management and label printing program which compliments Easyrite. Both are compiled and Basic source code is provided.

PC1005 WORD PROCESSOR FOR KIDS: Word processing program designed for children to help them learn about writing and using the computer. All this whilst keeping it fun. Ideal for children of all ages. Also suitable for partially sighted PC users.

PC1007 MYED MEMORY RESIDENT EDITOR: Memory resident "pop-up" word processor you can use even whilst using another program. Takes advantage of extended or expanded memory, or can swap from hard disk. If you have EMS only occupies 7K of DOS RAM. Manipulate files up to 500 lines in length.

PC1008 MINDREADER: Intelligent word processor which actually uses artificial intelligence to help you write. Learns as you use it to help make you more efficient. Has facilities for creating standard letter and memoranda formats, storing text that is frequently used, and combined with its inbuilt address book, glossary and calculator makes this an astounding program.

PC1009 PC DESK: Good program that allows you to keep a file of names and addresses and easily merge them into your documents using the inbuilt word processor. For the sake of completeness as a business tool also provides handy access to a calendar, calculator, and phone dialler.

PC1010 TECHWRITER: Word processor specially designed to make technical typing involving complex symbolic expressions fast easy and accurate. Lets you enter scientific formulae, tables, and figures into your document and uses screen colours instead of graphics for faster output.

PC1012 SOFTKEY EDITOR: Very user friendly text editor with many advanced features. Designed for both new computer users and more experienced users alike. On screen help available at all times and most features are displayed on the on screen menus. Also includes support for all video cards, and 43 line support for EGA and 50 line support for VGA, as well as calculator and calendar features.

PC1013 VIDEO DISPLAY EDITOR: Small, fast, and powerful text editor. Allows you to edit multiple files using windowing, find and replace, word wrap and reformat, undo deletions, keyboard macros, and a host of printing features, all in a program 34K in length. Also allows you to shell to DOS to run other programs. Great for laptop users, and those with limited memory or storage.

PC1014 SOMWEFT WORD: Good full screen editor program which allows you to edit text quickly and easily. On screen help is available at all times at the press of a key. Also includes a stand alone spelling checker that can be used to check the files produced. Spelling checker includes the option to suggest correct word if spelling is incorrect.

PC1015 RUSSIAN WORD PROCESSOR: This program transforms your PC keyboard into a Cyrillic alphabet typewriter as used by the Russian language, and can serve as a basic Russian word processor. The Cyrillic character set is displayed on screen, and can be printed to a Epson compatible dot matrix printer.

PC1020 SPELLCHECK: Good spelling checker suitable for all word processors using standard ASCII text files. Includes own large dictionary file which can be added to. Shows misspelling on screen, in context, with option to add word to dictionary. Maintains main dictionary plus alternate dictionary for specialised words. Menu driven for ease of use.

PC1021 THESAUR: Easy to use menu driven thesaurus program. You enter a word and several synonyms are displayed. You can then select a synonym and see its synonyms. You can edit synonyms, and also get a cross reference list of words used as synonyms for other words. Not memory resident.

PC1023A CROSS CHECK DISK 1: Powerful ASCII text spelling checker that gives the user a great deal of flexibility in checking and correcting text documents. Suitable for IBM and 100% compatibles as well as generic MS-DOS machines. Misspelled words and be viewed or sent to a text file. Words can easily be added and it supports additional specialized dictionaries. **Requires PC1023B.**

PC1023B CROSS CHECK DISK 2: Second disk of CROSS CHECK spelling checker. **Requires PC1023A.**

PC1024 SHARESPELL: Excellent stand alone spelling checker. Allows you to check text files, and displays the file on screen whilst checking. At each misspelling it gives you the option of replacing the word from a list of suggested correct spellings, manually correcting the word, adding the word to the dictionary, or ignoring the word. Comes with a dictionary of 50,000 words which can be easily added to.

PC1025 PROINDEX: Program helps you in the process of creating an index from any text file. It does this by comparing a keyword list which you produce with the text file and interactively produces an index for the text file.

PC1026 PC-INDEX: Program designed to produce an index to any text file similar to that found in the back of most books. PC-INDEX can produce an index on every single word in a document, or you can control which words will be included or discarded. Unlike most indexers you do not have to mark text to index in your document. Program requires 384K RAM minimum.

PC1030 JEPERS REFERENCE LISTER: Program designed to maintain a database of references to articles published in journals and books. It allows you to add, update, list, search, and format references in the format required for practically any journal.

PC1031 BIBLIOGRAPHY PERFECT: Bibliography program for use in conjunction with the WordPerfect word processor. The program will sequentially renumber references in a paper and its bibliography whenever new ones are added or removed, or when blocks of text are relocated. The text file is a standard WP document, and the bibliography is a WP merge file, so it can be adjusted to suit different journal formats. Also includes source code in Pascal.

PC1035 MAXIREAD: Superb style analyser which evaluates readability and complexity of your writing either directly from screen or from text file and then produces a comprehensive report on the text.

PC1036 PC-READ: Program that evaluates the complexity of a piece of text, based on an average grade level. Capable of analysing standard ASCII text as well as Wordstar and WordPerfect files.

PC1037 READRITE: Memory resident style analyser that allows you to determine the readability of text using the Flesch scale, of text on your screen as you type it. Not as sophisticated as the above programs but it lets you analyse the text as you write it.

PC1038 PROFESSIONAL SCRIBE: Excellent style analysis program for writers of all age. Provides report on the quality of your writing, as well as suggestions on how to improve it. Helps make your writing more effective. reads files in ASCII format, WordPerfect, MS Word, and Wordstar format, or you can type text directly into the program.

PC1040 FORM GENERATOR: Good form generating package with comprehensive help available on screen at all times. Allows you to produce good looking forms easily.

PC1041 EZ FORMS: Form generating program which allows you to generate master forms tailored to your individual needs, store them for subsequent use and print them as needed.

PC1042 FORM MASTER: Powerful forms software package that allows you to create, modify, fill in, and print forms. Allows you to produce blank forms to fill in later, produce forms with data already filled in, or just print the data required into forms previously produced. Supports most printers and can easily be configured for non standard printers. Even allows you to produce specific on screen help screens for your forms.

PC1043A PF FORM DISK 1: Powerful yet easy to use forms generating software. Form design, maths, date, and database, as well as "auto-edit" features are built in. The program can link forms to a database of names, addresses, and phone numbers etc, filling out the form for you. You can load and print any ASCII file, dress them up with boxes, lines, and shading, or vary fonts, line spacing, etc. to produce the form you want. Finally you can store the form for future use. Works with almost all printers including dot matrix and laser printers. Requires PC1043B.

PC1043B PF FORM DISK 2: Second disk of PF FORM set. Requires PC1043A.

PC1044 POPFORM: Memory resident program that can be called up from within any application to extract data from your screen, and merge it into a form that can be sent to your printer or saved to disk. Far more than just a label/envelope printing utility, POPFORM can be programmed to fill in virtually any form.

PC1050 SCREENPLAY FORMATTER: Text formatting program specifically designed for screenplays and teleplays. Takes your standard text file produced by almost any word processor and prints it in perfect screenplay format.

PC1051 IRIS ELECTRONIC BOOKMAKER: Interesting program allows you to easily create an electronic "book" to read on any PC. Make the most of the advantages of reading a book on a computer, such as being able to jump around instantaneously, and enhancing the presentation by the use of sound and colours. User input can be requested and stored, programs can be run from within the book. can be used for many applications from reference books to producing your own tutorials.

PC1055 DATABASE PUBLISHER: Great program which enables you to keep a database of items or people and produce a catalogue or booklet from the data stored easily. Allows you to produce your own catalogue, newsletter, personnel guide and more easily and cheaply.

PC1060 CITYDESK 3 DESK TOP PUBLISHER: Excellent text based desk top publishing package which supports up to 7 different fonts and several line spacings. Supports dot matrix printers and even allows multi column work on Epson compatible printers. Supports headers and footers and automatic indexing and in conjunction with Inset a commercial graphics program can satisfy most desktop publishing needs.

PC1061 PAGEONE DESK TOP PUBLISHER: Program designed for easy production of one page documents. Supports dot matrix printers. Good for producing flyers, cover sheets etc.

PC1063A FONTASTIC DISK 1: Excellent multi font printing program that can be used as a mini desk top publishing system. Provides a number of fonts including Helvetica, Italics, Script, Calligraphic, and more in a number of sizes. Includes program to make your own fonts as well. Requires PC1063B.

PC1063B FONTASTIC DISK 2: Second disk of FONTASTIC set. Requires PC1063A.

PC1070 COPYFIT-IT: Good program to aid in the typesetting of document. Program helps in figuring out what type sizes etc will make a text fit the space available for it in a layout.

PC1071 WORD PROCESSING PREVIEWER: Program produces an on screen representation of your ASCII word processor file thus allowing you to determine if the layout of your document is correct before sending it to your printer.

PC1080 THOUGHT ORGANISER: Thor, a brain scanning program. Record your thoughts, ideas, etc on any topic and store it with this system. Then review them, edit them, scan them, and print them as you need. Great for students and business people alike. Comprehensive on screen help available at all times.

PC1081 PC OUTLINE: Excellent thought processing program. Allows you to outline your thoughts, notes, etc, and rearrange them as needed so as to produce an effective outline to help with your writing. Can be used as a memory resident "pop-up" program or as a stand alone program.

PC1082 THOUGHT PLANNER: Innovative software tool for brainstorming and outline generating. It will allow you to record your creative ideas and flights of imagination as they occur to you, and then group them under major categories, and assign priorities in an outline form. You can easily realign them according to the perspective in which you wish to consider them.

PC1083 IDEA TREE: Powerful, and unique thinking tool. Unlike "outline" software, IDEA TREE takes a general concept, or "parent" idea, and allows you to visually separate the concept into its components or "children". Each of these components can then be broken down further allowing a immense amount of information to be detailed. the program uses a graphical representation and provides a number of print options. Menu driven for ease of use the program allows you to organise and document thoughts, books, reports, procedures, and much more.

PC1084A DYNAMIND DISK 1: Interesting program that can be described as an idea processor or thinking tool. You can use it whenever you have a particularly complex or important problem to solve, or to develop innovative or creative new approaches to a situation. It assists you in identifying and prioritising your goals, and in understanding what is motivating you towards them. Good for business and personal use. **Requires PC1084B.**

PC1084B DYNAMIND DISK 2: Second disk of DYNAMIND set. **Requires PC1084A.**

PC1090 FORM LETTERS 1: Collection of common business letters that can easily be tailored to your needs. All in standard ASCII format for use with almost any word processor. Includes overdue account letters, apologies, credit application and denials, order inquiries and many more.

PC1095 GRAB ENVELOPE ADDRESS PRINTER: Excellent memory resident program that allows you to point to the address in your letter, GRAB IT, and then print your envelope for you. Very useful.

DATABASE

PC1200A FILE EXPRESS DISK 1: Impressive, easy to use, menu driven database. Very powerful with extensive report, sort, and labelling capabilities. **Requires PC1200B.**

PC1200B FILE EXPRESS DISK 2: Second disk of File Express database. **Requires PC1200A.**

PC1201 RELATIONAL DATABASE: Freefile is a menu driven relational database which is capable of handling up to 2 Billion records, and perform calculations and comparisons on them. Each database can be indexed on up to 10 fields, with each record having up to 100 fields.

PC1204A PC FILE-DB DISK 1: Excellent new database program from Buttonware which allows you to read and write dBase compatible files which is totally menu driven. Features include graphic capabilities, 10 levels of sorting, macros, mail merge with built in word processor, context sensitive help screens, sophisticated report writer, customised data entry screens, and much more. **Requires Hard Disk and 416K RAM. Requires PC1204B and PC1204C.**

PC1204B PC FILE-DB DISK 2: Second disk of PC FILE-DB package. **Requires PC1204A and PC1204C.**

PC1204C PC FILE-DB DISK 3: Third disk of PC FILE-DB package. **Requires PC1204a and PC1204B.**

PC1205 INFOBASE: Database manager, forms generator, and mail merge program integrated into one package. Forms driven program, that is you create forms that match pre printed forms and can be used to produce reports in the forms format. Each database can access multiple forms and also produce customised letters and forms.

PC1206 PBASE: Programmable relational database management system designed for programmers. It provides facilities for querying and manipulating data, as well as report writing. Data may be accessed and revised using interactive commands or through user written application programs. PBASE is based on Structured Query Language technology.

PC1207 ANYWORD: Good text indexing and retrieval program. Consists of an indexer which indexes your text file and a finder program to easily locate any word or combination of words in the text file.

PC1208 TRILOGY: First rate note retrieval system. Originally designed for authors to keep track of multitude of notes, this program has a number of uses for business and home. Ideal for keeping track of correspondence, lecture notes, and much more.

PC1209 FCPO DATABASE: Excellent free form database which describes itself as an electronic filing cabinet. Allows you to file away text of any length up to 1 Billion lines. Items can be entered from the keyboard or imported from an external text file. Files can also be easily exported to any application which uses ASCII files. You may assign any set of keys to an item up to 79 characters, and the files produced are compatible with dBase III. You may have any number of filing cabinets active at any time.

PC1211A WAMPUM DISK 1: Wampum, a great program which allows you to access and use dBase III files and programs. Includes comprehensive documentation on disk. This is a very powerful program suitable for those who wish to learn or use dBase. **Requires PC1211B.**

PC1211B WAMPUM DISK 2: Second disk of the dBase compatible database. **Requires PC1211A.**

PC1212 ONLINE DBASE HELP: Help for users of dBase III and compatible databases in the form of a database of the commands for the program and the Clipper compiler which can be accessed easily, even from within other programs.

PC1213 WYNDFIELDS DATABASE: First rate general database useful for keeping track of any structured information. Allows for easy data editing, label and report generation. Multiple indexes are automatically maintained, and several methods for extracting exactly the information you need are provided. For advanced users extensive string and maths functions, as well as date and time tracking are available. **Requires 512K RAM minimum.**

PC1214 dFLIPPER db ENGINE: Program allows you to browse, search, edit, and re-index dBase compatible files. Provides a quick and easy way to examine and modify files created by any program using dBase compatible files. Other features include a pop up calculator, context sensitive help, relational set up capability, word processor merge file export capability, and a built in editor. **Requires 512K RAM minimum.**

PC1215A PROFILE DISK 1: Profile Professional Filing System is a sophisticated tool designed to help you keep track of all the important information you need. The program allows you to file and retrieve information, create meaningful reports, print labels, and even share information with other programs. The program uses a free form data entry method to allow you to keep all types of information easily. **Requires PC1215B.**

PC1215B PROFILE DISK 2: Second disk of the Profile Professional Filing System. **Requires PC1215A.**

PC1220 ONBASE MEMORY RESIDENT DATABASE: Excellent memory resident pop up database which allows you to have up to three databases resident on your computer at all times.

PC1221 dLITE: Memory resident pop up utility which gives the user access to up to ten dBase III compatible applications from within virtually any text based application. Allows you to add entries, display or update records with up to seven indexes, create entry screens, create customised lists, labels, and reports, and more.

PC1240 FILEMASTER: Program designed to help you manage your PAPER files. Allows you to maintain your paper files in serial number sequence. You can then look up the document by subject, category, sender, receiver or a number of other criteria. Allows you to keep control of your files easily and effectively. Menu driven and files are dBase III compatible.

PC1241 PC-LIT ARTICLE INDEXER: Good program that provides speedy, uniform and reliable method of finding articles from magazines without the need for complicated librarian type packages.

PC1242A BIBLIO FILE DISK 1: Citation management program designed to keep track of literature references. Provides the writer with the capacity to automatically file citations by subject matter in addition to the use of key words. Allows for easy re classification of articles, and easy entry of information. Fully menu driven. **Requires 380K RAM. Requires PC1242B.**

PC1242B BIBLIO FILE DISK 2: Second disk of BIBLIO FILE program. **Requires PC1242A.**

PC1243 LIBRARIAN DATABASE: CASSY, Catalogue card/Accession and Shelf list System. Database especially designed to aid librarians in keeping track of items kept in their library. You enter information on each item and the program allows you to produce catalogue cards accession listings, and shelf listings. Easy to use and menu driven this program is suitable for all libraries using the Dewey Decimal system.

PC1244A PERSONAL INFORMATION ORGANISER
DISK 1: Excellent program for organising related pieces of information such as research, reference manuals, bibliographies, glossaries, and virtually any other type of information. The program links items of information to other items based on connections made in the form of keys which you define. Every item of information can act as a key which gives the program an exceptional degree of flexibility. Reports can be produced easily from the program providing a wealth of information. Requires 320K RAM. Requires PC1244B.

PC1244B PERSONAL INFORMATION ORGANISER DISK 2: Second disk of Personal Information Organiser program. Requires PC1244A.

PC1245 LAWYERS RESEARCH: Program designed for legal professionals to help research and document evidence. Program allows you to enter notes on evidence, research your conducting, and more. You may enter such details as the source, page, and line number where each item can be found. You may also enter a 11 line summary of the item and indicate the subject category into which the item falls. The program can be used to produce comprehensive reports on all evidence entered, and to scan the notes for important information. Requires 512K RAM and a hard disk.

PC1252 TELESale: Database designed for people involved in telemarketing or sales in general. You enter client or prospect data on screen, and maintain accurate records of contact with them and other relevant information.

PC1253 CONTACT PLUS: Excellent program for keeping track of business contacts. It automatically sorts your contacts by surname, company name, post code, and two user defined fields. It allows you to add an unlimited number of notes per contact, all of which are date/time stamped. Allows you to keep track of the last 30 phone calls to the contact, and will even dial the number for you with a Hayes compatible modem. Allows you to produce personalised letters, mailing labels, tickler files, and much more.

PC1254 CARDX: Program produces a rotary index card file for names, addresses, phone numbers, and notes. Multiple data files can be created, and you can search your files quickly, or just browse through them. Program will even dial the number on a Hayes compatible modem.

PC1260 NAME-PAL: The complete automatic address book. Store your names, addresses, and relevant information on your PC and then use it to produce a pocket sized book of them. Can also produce mailing labels, rolodex cards, and full page rosters. Menu driven with on screen help.

PC1261 MEMBER & DONATION TRACKING: Program allows you to keep track of members of any organisation, print labels for all or selected members, as well as a directory of members. You can also record the pledges and subscriptions for members. You can also print donation reports for tax purposes, plus financial reports. Requires 384K RAM and a hard disk.

PC1262 LITTLE BLACK BOOK: Simple to use name, address, and phone number database which allows you to print a pocket sized alphabetic booklet with all the information. Excellent for keeping your address book up to date. Supports Epson and OKI printers as well as HP Laserjet Series II printers. Can be easily configured for any printer which can print at 17 characters per inch, ie condensed mode.

PC1270 MUSIC LIBRARY SYSTEM: Menu driven database program that enables you to catalogue your records, tapes, CD's, scores and sheet music. Each record file contains fields for composer, title, category, performers, comments, and four library location fields for multiple recordings of each composition.

PC1271 VCR DATABASE: Program designed to provide an easy structured system for keeping track of your video cassette library. Stores details such as title, stars, style of movie, position on tape, and other details. Can be used to print out a comprehensive video list.

PC1280 dBASE III SCREEN CODE GENERATOR: Allows you to generate dBase III screens and code quickly and easily. Suitable for those who program in dBase.

PC1281 INTELLI-TRIEVE: Weighted retrieval utility for users of dBase III and dBase III+, and compatible database managers. Compares records in a database to user defined selection criteria, and producing a copy of the database in descending order of acceptability. Very useful for heavy dBase users.

PC1282 MENU SYSTEM FOR dBASE III+: Litebar is a routine usable within dBase III+ to quickly generate menus which are compatible with dBase, Clipper, Quicksilver, and Foxbase+.

PC1283A dBASE DOCUMENTATION AND DEVELOPMENT SYSTEM DISK 1: SNAP, a program designed to help the dBase programmer write his documentation and source code more efficiently. Requires PC1283B.

PC1283B dBASE DOCUMENTATION AND DEVELOPMENT SYSTEM DISK 2: Second disk of SNAP dBase utility. Requires PC1283A.

PC1284 dBASE ACCOUNTS RECEIVABLE: Accounts receivable package written in dBase III+, with source code. Useful for dBase programmer to learn techniques or can be used with dBase as a full accounts receivable package.

PC1285 QUERY: Flexible, easy to use program to query dBase files. Menu driven for ease of use this program is fast and efficient at selecting data from .DBF files produced by dBase and compatible databases. You select the database, the fields, and the data you wish to query, and the program produces a list in columnar format which allows you to more efficiently select the records you require.

PC1286 DEDIT DATABASE EDIT UTILITY: Program allows direct editing of dBase III and 100% compatible files such as Clipper, Foxbase, etc without having to have copies of the programs.

PC1287 DBCLEAN: Utility designed to search for and remove duplicate records in dBase compatible data files. This allows you to save disk space and program, processing time. On screen help available at all times.

PC1288A DBASE PROGRAM GENERATOR DISK 1: dProg is a dBase programming utility that allows you to generate screens, format files, validate files, databases, entire systems, and their documentation easily. The program is composed of five main applications; the system integrator, the screen designer, the compiler, the documentor, and the system convertor. Together they allow you to produce complete applications in dBase III+ code which should run under dBase, Foxbase, 1 ON 1, or any other dBase compatible program. Requires PC1288B.

PC1288B DBASE PROGRAM GENERATOR DISK 2: Second disk of the dProg program generator. Requires PC1288A.

PC1289 DRMENGEN DBASE MENU GENERATOR: Drop down menu shell generator for CLIPPER and dBase III. It permits the user to quickly re edit menu shells through the use of configuration data files written to disk as well as the generated menus.

PC1300A SERVICE PLUS DISK 1: The ultimate maintenance and service tracking system. Suitable for any business that provides product service or support, as well as repair companies. Program handles appointments, billing, expenses, activity files, and much more. Can be customised for your business and allows you to produce your own specific help screens. Requires 640K RAM and a hard disk. Requires PC1300B.

PC1300B SERVICE PLUS DISK 2: Second disk of the Service Plus program. Requires PC1300A.

SPREADSHEETS

PC1400 LOTUS COMPATIBLE SPREADSHEET: Aseasy, an excellent Lotus 123 compatible with almost all the features of the famous program and an easy to use interface makes this the ideal spreadsheet for most users. Includes graphing, macros, financial and statistical functions and much more. On screen help available at all times.

PC1401 QUBECALC: Advanced spreadsheet for power users. Acts as a true three dimensional spreadsheet which allows you to examine data from any perspective. Includes graphing facility and powerful macro facility and much more. Allows you to link separate spreadsheets.

PC1402 THE THINKER: Small spreadsheet that works on PCs with only 128 K of RAM. Similar in structure to Lotus 123, this spreadsheet will enable you to enter text and numbers on screen, define mathematical relationships between them, and perform calculations quickly and easily. Useful for financial modelling, budget calculations, and more.

PC1403A POWER SHEETS DISK 1: Powerful 3D programmable, spreadsheet program that was chosen as PC Magazine's Editor's choice before becoming shareware. Features include large 3D structure, up to 255 columns by 255 rows by 255 pages, ability to rotate the cube to view data in different ways, date and time maths, inbuilt programming language, and much more. Designed a serious business tool. Requires PC1403B.

PC1403B POWER SHEETS DISK 2: Second disk of the Power Sheets program. Requires PC1403A.

PC1410 INSTACALC: Powerful memory resident "pop-up" spreadsheet which can be used from within other applications and which can share data with other programs easily. Can be used to enter tables into word processor documents, or import data directly off your screen into the spreadsheet. Even able to read Lotus123 .WKS files. Interactive help screens at all times make it easy to learn.

PC1420 GOALSEEKER: Excellent program that can be used in conjunction with almost any spreadsheet program to automatically find solutions with a reverse or backward search method. You can find the solution to your spreadsheet problem by entering the data you want and watching as this program then changes the variables to produce the required response.

PC1450 WORDPLAN: Document processor for Lotus 123. Allows you to read multiple Lotus files and produce custom reports and documents. When values change in your worksheet program updates your document and reformats it. Also includes an interactive modelling language with full maths and financial functions which can be used alone to provide integrated text and numeric processing. Also includes a powerful script processing language so that users can create interactive applications.

PC1461 LOTUS 123 VIRTUAL MEMORY EMULATOR: Utility program for Lotus V 2.0 that allows your hard disk or RAM disk to emulate expanded memory for the program. Requires that your system already have 640K RAM. Useful if you use very large spreadsheets etc on Lotus.

PC1470 LOTUS WHITEROCK: Macro based user friendly front end for Lotus 123 or compatible spreadsheets. Also provides library of macros and series of useful worksheet templates for Lotus.

PC1471 LOTUS ORGANISER: Allows you to keep track and/or retrieve any Lotus file without the need to remember the file name. It allows you to attach a description to your Lotus worksheet and retrieve or search for files using the description or keyword within the description. requires Lotus 123 version 2.0 or greater.

PC1472 123 SHELL: Worksheet based shell for Lotus 123 or compatible spreadsheet program that provides extra menus for constructing your own worksheets and also has an appointment scheduler and diary system.

PC1480 LOTUS STATISTICS: Collection of Lotus worksheets for various statistical functions. Includes decision making model, trend analysis, descriptive statistics, polynomial regression, and more. Useful for statistics or as an aid in learning about Lotus. Requires Lotus 123 or compatible spreadsheet program.

PC1481 LOTUS BUSINESS NO. 1: Ten worksheets for use with Lotus 123 or a compatible spreadsheet program. Includes templates for balancing a cheque book, cash disbursements, cash flow management, cash flow projection, loan amortisation, loan payoff calculator, line of credit tracker, depreciation calculator, internal rate of return calculations, and account receivable tracker.

PC1482 LOTUS BUSINESS NO. 2: Ten more Lotus worksheets for use with Lotus 123 or a compatible spreadsheet program. Includes economic order quantity calculator, 5 in 1 financial statement, ratio analyser, growth capacity calculator, queue analysis, new venture budget, price volume analysis, and a quote generator. Also includes some Lotus macros.

PC1490 LOTUS BEGINNERS CLASS: Tutorial program from the US which is designed to help new users to learn how to use Lotus or compatible spreadsheets such as our ASEASY. Requires Lotus or compatible program.

PC1491 LOTUS ADVANCED CLASS: Continuation of the beginners class. Covers more advanced features of Lotus and compatible spreadsheets. Requires Lotus or compatible program.

PC1492A LOTUS LEARNING SYSTEM DISK 1: Program designed to teach the novice computer user how to use LOTUS 123, or a compatible spreadsheet program. The program starts by going over the menu and how it works. Then you choose the option you would like to start with. From this menu you may choose spreadsheet background, applications for Lotus, keyboard features, access system, control panel features, trial balance model, and more. Requires 512K RAM and two disk drives, or a hard disk. Requires PC1492B.

PC1492B LOTUS LEARNING SYSTEM DISK 2: Second disk of Lotus Learning System program. Requires PC1492A.

PC1495 POWER SHEETS FOR LOTUS 123: Collection of Lotus 123 worksheets for basic business functions. Models include basic Statistical Summary, depreciation, Net Present Value, Profitability and Breakeven analysis, Rate of Return of cash flow using three methods, and Simple Linear Regression analysis. Requires Lotus 123 or a compatible spreadsheet program.

FINANCE/ACCOUNTING

PC1601 PC BOOKS: Easy to use general ledger package for small business and home use. Uses easy to remember mnemonics instead of complicated account codes.

PC1602 GENERAL LEDGER II: Fully featured general ledger package for professional use in businesses of all sizes. Handles up to 300 user defined accounts, has comprehensive reporting facilities, easy to use transaction entry features, cheque register and audit trail facility, cash journal facilities, password protection, and much more.

PC1603 FM II LITE GENERAL LEDGER: Personal and small business financial management program. Full functioned general ledger which can be linked to the accompanying modules, or used as a stand alone application. The General Ledger module provides for a full accounting facility with exceptional ease of use. The program is completely menu driven, and provides a number of reports including balance sheet, trial balance, account history, income statement, and more.

PC1604 FM II LITE ACCOUNTS RECEIVABLE: Accounts receivable module can be used as a stand alone application, or in conjunction with FM II LITE GENERAL LEDGER. Allows you to keep track of all your customer receivables. It allows you to set up customer accounts as well as customer billing. The program allows you to print statements on blank paper as well as pre printed forms. Allows you to add finance charges to overdue accounts as well as produce and print or view on screen a number of reports.

PC1610 PC GENERAL LEDGER: Powerful general ledger program that emulates the traditional accountant's double entry book keeping system. Includes a number of features that make the program easy to use by non accountants such as the ability to automatically balance any entry, the ability to edit data previously entered, and more. Good for business and professional use. Well documented.

PC1620 CASHTRAC: Excellent personal and small business finance manager and cash book system. Allows you to keep track of all accounts, expenses, bills, tax deductions, and more! Easy to use and very user friendly.

PC1621 FASTBUCKS: User friendly home finance package. Designed for the non accountant to manage their home finances. Includes module for budgeting, financial calculation, and loan amortisation.

PC1622 HOME ACCOUNTANT: Program designed for the home bookkeeper who finds simple chequebook managers insufficient but does not want to get involved in complex accounting systems. Manages up to 255 different accounts and perform a net worth calculation easily.

PC1623 PC BILL MASTER: Cheque book management program that is quite easy to use. Has a regular cheque book register type display and maintains recurring payments. Allows for easy bank statement balancing and up to 100 ledger accounts.

PC1624 HOME ACCOUNTS: Full featured home accounting system that is very easy to use. Online help is available at all times, and pop up windows provide you with an easy choice of entries at all times. Bill paying feature reminds you when regular bills are due, and even lets you know if you can afford them. Summarised reports can be produced, and it even projects expenses to help keep you within a budget.

PC1625 EXPRESS CHEQUE: Excellent cheque register program that is extremely easy to use. The various screens are designed to look like your paper cheques, deposit slips, etc to make learning the program easy. Every cheque and deposit can be recorded to various budget codes that you set up. Reports giving you monthly and year to date totals for any or all budget codes, average monthly amounts, cheque register with running balance, all transactions not cleared, and much more can be easily produced.

PC1626 FAMTRACK: Powerful, comprehensive home accounting package. Designed for ease of use the program will keep track of every penny you earn and spend, and sort your expenditures into as many as 40 categories. It will allow you to establish monthly budgets for each category and then compare your actual performance against the budgeted amounts. It can also forecast annual expenditure in each category, based on your spending record to date, and enable you to maintain control of your finances. Up to 20 separate financial accounts such as bank accounts, credit cards, etc can be maintained, and funds can be moved from one account to another. Your accounts can be easily reconciled.

PC1641A MR BILL DEBTORS SYSTEM DISK 1: Program designed to help maintain control of your debtors. Produces itemised invoices and bills, ageing reports, audit trails, and a number of other useful reports. Flexible system suitable many uses. Requires PC1641B.

PC1641B MR BILL DEBTORS SYSTEM DISK 2: Second disk of Mr Bill Debtors System. Requires PC1641A.

PC1642 SPC ACCOUNTS RECEIVABLE: Menu driven easy to use accounts receivable program for product and service based businesses. Prints statements.

PC1643 THE INVOICER: Complete invoicing and statement generating program for small to medium sized businesses. Allows you to produce invoices on standard paper, and will then automatically post the invoice to the accounts receivable module which will produce monthly statements and provide updated reports on your customers accounts.

PC1644 STARBOOKS: Inventory control and accounts receivable package suitable for small to medium sized businesses. easy to use and menu driven throughout this program allows you to keep track of your inventory, produce sales orders and keep track of your accounts easily. Will produce purchase orders for out of stock items, produce shelf labels, part lists, and invoices as well as statements, and produce reports on outstanding invoices.

PC1645 PURCHASE ORDER SYSTEM: Keep track of your creditors and your purchase orders easily using this program. Keep track of your vendors, purchases, and how much you owe. Includes comprehensive report options.

PC1650 BUDGETRACK: Program written to track business type budget disbursements. It tracks disbursements on three levels, against the actual disbursement, against the specific item, and against the project itself. Enables you to track expenses efficiently.

PC1655 FINANCIAL FREEDOM: Program designed for home use in structuring a family budget and tracking expenditure. Tracks up to 20 different home budget categories for both husband and wife, tracks activity in up to 10 separate financial accounts including credit cards, Easy cheque reconciliation function and easy to use.

PC1656 BANKBOOK: Program specifically written for children to keep track of their spending money and allowance payments. Very easy to use and good learning experience for kids.

PC1660 BILLPOWER: Excellent time keeping, billing, and book keeping program designed especially for small firms. It will track time worked on professional matters and calculate the amount owed by each client. It will also keep up with receipts and disbursements, and it will maintain such accounts as you wish, allowing you to carry out simple bookkeeping functions. It will also automatically compile services, disbursement, and receipt transactions for each client into monthly bills. Program requires HARD DISK.

PC1680 FINANCIAL PARTNER: Easy to use financial package which allows you to calculate future value of an investment, minimum savings for future value, effect of withdrawal from an investment, present value of an investment, a range of loan calculations including amortisation, calculation of available loan for a given monthly payment, present balance, and more including net present value and internal rate of return calculations.

PC1681 SOLVE-IT: Financial analysis program which can operate as either a stand alone program or a memory resident "pop-up" program. Among its functions are return on investment, break even analysis, depreciation schedules, loan schedules, and even statistical functions. 28 functions in all.

PC1682 KEYRATIO: Simple, straightforward program to calculate the ten most common Key Business Ratios. The program is intended to be of help to those who need a quick idea of the financial ratios of their businesses. The calculations include Current Ratio, Average Collection Period, Net Profit to Total Assets, Inventory Turnover, Total Debt to Net Worth, Net Sales to Total Assets, Operating Profit to Net Sales, Net Profit to Net Worth, and Sales to Accounts Receivable.

PC1700 PORTWORTH STOCK MONITOR: Set of applications to use to monitor and evaluate stock portfolios of up to 25 stocks. Includes graphic representation of stock values, and report facilities for stock values.

PC1702 STOKTRAX: Stock analysis program that lets you store high, low, and closing prices and volumes for a stock in a file, recall the data and edit it, or add to it, analyse the data on screen, plot the data on screen or printer with numerous plotting options and more.

PC1705 SAGE STOCK TRADER: Program analyses, displays, and prints commodity price records. It permits the trader to concentrate on trends instead of details. Data entry and review are quick and easy, and the program can be adapted to almost any printer. It offers menu driven convenience at all times and data is automatically saved whenever changes are made.

PC1720 PDS QUOTE: Program designed to allow you to quickly and accurately prepare quotations for various projects. Uses both standard and non standard items for building your quote, and maintains a database of standard cost items.

PC1721 BIDS N QUOTES: Program maintains a database of bid items together with labour, equipment, materials, and sub contractor costs. Labour cost can be maintained by both time and monetary values, allowing for various costing methods to be used. From this data the program can calculate cost estimates and proposals.

PC1722 QUOTEMASTER DATABASE: Package designed to let you keep track of a number of different quotes and gives you the ability to print them out at any time. Also allows you to produce a bill of materials from the quote.

PC 1723 BIDBIZ: Estimating program that lets you tie multiple component and phase costs to the bid or primary items. The program uses multiple record windows for viewing, editing and various look up purposes. Allows you to easily create estimates and quotes from master files. Requires 512K RAM minimum, and a hard disk.

PC1724A PC ESTIMATOR DISK 1: Easy to use program designed to increase the efficiency and productivity in cost estimating. It is developed by construction professionals who are also experts in computers. It provides immediate on-screen access to data through "lookup" windows, material price list and cost data accumulation, easy to use menu structure, time saving features, unlimited size database, ability to use different markups, built in comprehensive reporting, and much more. Requires 384K RAM minimum, and hard disk recommended. Requires PC1724B.

PC1724B PC ESTIMATOR DISK 2: Second disk of PC ESTIMATOR program. Contains data files and accessory files for program. Requires PC1724A.

PC1730 COSBIZ JOB COSTING PROGRAM: Good program designed for those needing an easy to use, stand alone job cost program. It uses auto look up tables and scrolling record windows for ease of use. The program provides four types of cost records; Equipment, Labour, Materials, and Subcontractor costs. It also includes the option for percentages or quantities to be used in the cost item. Various reports are provided for either cost method used, both can be used if desired. Program requires 512K RAM and wide carriage printer.

PC1740 PC-SELL: Point of sale which includes inventory control, accounts receivable, and invoice production. Allows for easy reporting of profit, margins, and customers with up to 26 departments allowed. Also allows for control of credit customers.

PC1741A SALES PROCESSOR DISK 1: Good program for keeping control of sales, inventory, and debtors. Allows invoicing, statement generation, and stock lists to be produced. Requires PC1741B.

PC1741B SALES PROCESSOR DISK 2: Second disk of Sales Processor program. Requires PC1741A.

PC1750 SPC INVENTORY: Good stand alone inventory program. Inventory, sales, and purchases are sorted using a 12 digit numbering system. Program also provides a replacement cost report when sales exceed inventory. Sales tax can be added and up to three selling prices can be handled per item. Hard disk required for optimum use.

PC1751 TINY MASTER: Inventory control program with many features. easy to use it handles storing, updating, viewing, and adjusting inventory information. It also provides several report features as well as automatic updating of all relevant files. Suitable for all uses from home inventory to warehouse inventory control. Complete on line help available at all times. Requires 384K RAM.

PC1752 INVENTORY MASTER: Sophisticated program designed to reduce the cost of purchasing inventory. The program uses the Economic Order Quantity (EOQ) concept to produce an "Inventory Order Report" containing restocking instructions for all of your company's inventory items. For each item the program tells you how many to buy and when to buy. Handles different vendors with different discount schemes to enable you to take advantage of their discounts.

PC1760 STOCK TRADER: Good stock portfolio management program that easily allows you to chart your stock movements. Provides graphical and text based reports.

MISCELLANEOUS BUSINESS

PC1800 EMPLOYMENT EVALUATION SYSTEM: Program uses responses from a series of descriptive statements to determine an employers requirements for a position. It then tests employees/applicants for their suitability for the position. Based on the responses the program produces a comprehensive report on the applicants and their suitability.

PC1801 HIRE: Program designed to help you respond to all who apply to you for jobs, grants, information etc.. It writes acknowledgment letters for you, alerts those who have not sent all the support documentation, list the applicants and help you make your decision.

PC1803 RESUME: Program teaches you the art of good resume writing while coaching you through the eight available section. requires BASIC.

PC1810 EMPLOYEE: Program designed for employees to keep track of their employees. Allows employer to maintain and retrieve information such as birthdays, anniversaries, and notes on employees and thus help you improve rapport with them.

PC1820 PUNCH-IN: Program turns your computer into an employee time clock. the employee simply calls up the program, enters his/her four digit ID, and the program saves the ID, date and time in an encrypted file. To log out the employee calls up PUNCH-IN and enters the ID as a negative number. Program can be used as either a stand alone program, or a memory resident pop up program.

PC1830 PREVENTIVE MAINTENANCE: Easy to use tool that helps reduce maintenance bills for any size company or individual. Lets you produce and update regularly maintenance schedules for all plant and machinery in your business or home.

PC1831 VEHICLE EXPENSE AND MAINTENANCE: Two programs to help you maintain both the condition and the expenses related to a motor vehicle.

PC1832 EIMS MAINTENANCE SCHEDULER: Equipment Inventory & Maintenance Scheduler. This program maintains an equipment inventory, user defined maintenance costs for each item, and scheduled maintenance for each item. Maintenance can be scheduled for almost anything needed. Although based on time schedules, this can be used for at least checking other maintenance based systems. Program requires 512K RAM minimum.

PC1833 PC MECHANIC: Maintenance management system for businesses of all sizes. Provides a computerised work order and preventative maintenance system that keeps track of work orders, maintenance schedules, and keeps track of all relevant records. Menu driven for ease of use. Requires 512K RAM and hard disk.

PC1834 AUTO MANAGER: Easy to use menu driven automobile management system. Program allows you to keep track of up to nine vehicles, each with up to nine user defined item categories. The number of transactions is limited only by your disk space. You may set up maintenance schedules and check to see when maintenance was done and is due for a particular vehicle and category. Reports may be printed by vehicle or category. Requires hard disk.

PC1835 GEMOLOGIST INTEGRATED APPRAISAL: Specialised appraisal package for Gemologists. Suitable for precious stone appraisals and accounting.

PC1840 SURVEYSOFT: Program designed for those interested in surveying. Comprehensive package with very comprehensive documentation. Includes features such as field traverse, bearing and distance intersection, radial inverse and more.

PC1850 RENTAL PROPERTY DATABASE: Menu driven application for managers of rental properties. Holds information on up to 1000 units of property and lets you print reports on tenants and properties.

PC1851 REAL ESTATE INFORMATION SYSTEM: Real estate investment and/or brokerage data system consisting of a loan calculator to compute repayments and amortisation schedules, depreciation calculator for both straight line and accelerated methods, and a database for up to 800 properties which stores all the relevant information.

PC1852 PROPERTY MANAGER: Program designed to help those who manage multiple properties. Allows for the integration of all information required by property manager including rent details, end of lease date, tenant and owner details, and maintenance reports. Allows for flexible options and can generate work orders.

PC1853 PC AGENT PROSPECT FILER: Easy to use program designed to allow agents to keep track of prospects with information such as price range, type of home, size of home, income, deposit size, etc to enable them to pick ideal prospects for house when it comes on market.

PC1860 MANAGEMENT TUTOR: Collection of documented programs that provide a complete computerised mini-management course provided in an educational and entertaining way. Written by a Management Seminar Instructor it covers areas such as communication, delegation, decision making, interviewing, planning and more.

PC1861 MANAGEMENT MENTOR: Program provides focused guidance about the specific skills you should develop to become a more effective manager. There are twelve separate questionnaires, allowing you to evaluate your skills in any or all of the categories. The categories are Managing Projects, Communication, Creating a Motivating Climate, Financial Decision Making, Managerial Problem Solving, Business Development and Sales, Organising, Representing the Organisation, Planning, Management Control, Staffing, and Influencing Others. The program saves your results, and provides you with help.

DESKTOP UTILITIES

PC1870 DESKTEAM: Memory resident "pop-up" utility which provides instant access to a calendar, notebook, calculator, dos and printer commands, and more. Do not have to exit the program your using as this program pops up over it.

PC1871 MY DESK: Pop-up desktop utility that includes powerful editor, an appointment calendar with pop-up alarm and daily reminder, a calculator, an ASCII table, and a DOS file command shell. It can also be used for printer control and pop-up help screens.

PC1872 MOE DESKTOP UTILITY: MOE is a hand program that's designed with the typical business user in mind. It will schedule upcoming events, and allow you to set up to 20 alarms per day, hold phone numbers, addresses, and notes about your acquaintances, maintain a record of your expenses, and the time you spend working on various projects, allow you to establish numerous mini databases such a to-do lists, account numbers, etc, provide a convenient way of briefly describing the contents of each file in a subdirectory, provide a 20 line calculator "tape" and the ability to transfer results to other programs, and also send control sequences to your printer, all in one memory resident program. **HARD DISK required.**

PC1875 PRODEX PLUS: Memory resident personal information system that combines a phone manager, to-do list manager, correspondence manager, and a "loose data on the desk" manager in one easy to use program. Not a single desktop utility but a powerful productivity tool for business people.

PC1880 TELEMESAGE: Memory resident pop-up telephone message system designed for use on stand alone computer and network systems. Messages can be kept for any number of people who can call up and print their messages quickly and easily.

PC1890 CTRLALT: Collection of memory resident utilities that provide two monitor support, pop up ASCII, ANSI colour codes, and keyboard scan tables, non keyboard graphic character entry, cut and paste between screens, resident printer codes, and emergency exit from system crashes.

TIME/PROJECT MANAGEMENT

PC1900 TERRA TIME: Interesting program that logs the time in up to 44 cities around the world. Takes into account not only time zones but daylight saving as well.

PC1910 TIMESAVER+: Excellent time scheduling program for busy people. Includes calendar which resembles your standard monthly desk calendar and allows you to place appointments at half hour intervals from 6:30 AM till midnight. Lets you view graphically appointments for a month at a time. Menu driven and very easy to use.

PC1911 ABOUT TIME: Complete time/calendar management software package. It can manage the schedules of up to 30 people or things with unprecedented ease. The program also provides for the automatic execution of programs at specified dates and times. Up to 500 events can be scheduled. Can be used as a memory resident "pop-up" program or as a stand alone application.

PC1914 PC-TICKLE: Great time management package lets you organise your schedule better. Allows you to display daily agenda at any time, maintain a history log of tasks accomplished, print a copy of your schedule to use as a checklist, view past or future schedules, track and total your expenses, balance your chequebook, track your calorie intake, and more!

PC1915 EZ-TICKLE: Reminder program which maintains and produces to-do lists. Setup tasks and activities which can be one-time or repeating with wild card functions for example first Monday of the month etc. Also includes time billing module.

PC1916 TO DO PROGRAM: Time planning program with a difference. Not only manages To Do lists but also actively encourages better time management using Alan Lakein's proven time management priority-setting techniques. Allows you to print out updated list to fit appointment book system.

PC1917 MAKE MY DAY: Complete computerised time management system for your PC. It is an Appointment Calendar, a Job Scheduler, a Time Log, and an Expense Account Manager. Produces handy Daily Reminder Report, helps prioritise your jobs, provide work in progress reports, and even allows you to keep track of time spent on each client or project.

PC1918 JUDY APPOINTMENT MINDER: Good appointment scheduling program. keeps track of Up to one thousand appointments pending at any one time. Runs in memory resident mode taking as little as 7K RAM. Provides long range views of appointments as well as daily view. You can search for any appointment by typing in the name, or even part of the name. JUDY can also print out your schedule as well as maintain and address and phone book for your contacts.

PC1920 TIMEKEEPER: Interesting program that logs time usage on your PC. Lets you log on and off specific programs and prints out a report of how long each person spent on particular projects. Useful for those who bill computer time, or who wish to see how much their computer is used for business.

PC1921 WORKLOG: Specialised program for time billing of clients or projects. Enables you to produce a bill for clients based on your hourly charge rate.

PC1922 TIME TRACKER: Time management and billing package for people who bill their services by time. Allows you to keep track of clients, time spent on their projects, produces invoices for your services, and keeps track of accounts receivable and any

income. Also has a number of useful report options.

GAMES

PC1923 YEAR PLANNER: Organising tool which mimics the familiar "write-on wipe-off" wall planner calendar system most businesses use to schedule important events. You are allowed to write deadlines, appointments, and other important information into "day blocks" which can later be printed out in a large standard calendar format. Information can easily be updated or erased altogether, and reprinted. Features include an overlay template to apply similar messages in many "day blocks", an on screen year summary so you can see the whole year at a glance, and large calendar printouts. Requires 512K RAM.

PC1930 YEARCAL: The ultimate calendar maker. This program will print single or multiple copies of a calendar of any year starting from any date you set, and also allows thirteen month calendars to be printed. Even 3 digit Julian calendars can be printed. Calendars can be printed or viewed on screen. Also allows you to print monthly, weekly, or daily schedules..

PC1950 MEMOIRS: Feature packed private diary which allows you to encrypt your data as you type to stop others viewing it. It can also be used to encrypt any ASCII file. Also lets you access DOS without exiting from the program. On screen help available at all times.

PC1960 PCPM PROJECT MANAGER: System of interactive programs written in BASIC for project management using the Critical Path Method to calculate various factors including critical path, costs, and Gantt charts. Menu driven, able to handle upto 500 tasks, subcontractors, etc.

PC1961 APF PROJECT MANAGER: Impressive menu driven set of project management tools. Allows you to quickly produce, store, retrieve, and update project schedules. Allows you to produce graphic and text based reports on various projects and calculate the various factors required.

PC1962 EASY PROJECT: Project management tool which allows upto 20 user defined project phases, unlimited number of resources per project, upto 1000 user defined tasks per project, fast data entry, automatic scheduling, and Gantt chart production as well as comprehensive reporting and dBase III file compatibility.

PC1963 IPM PROJECT MANAGER: Critical Path Method Project Scheduler program. Small and easy to use. Handles up to 99 activities, and produces various reports and plots to an Epson compatible printer.

PC1964 PC-PROJECT: Complete critical path project management application designed to run under Microsoft Windows. Features include pull down and Lotus 123 style menus, full mouse and keyboard interface, displays a project as a PERT chart, a Gantt chart, a list of activities, or a list of resources. The program automatically recalculates the critical path of the project using CPM or PERT algorithms, allocates costs to tasks on either a fixed cost basis or by assigning resources. Requires Microsoft Windows 2.0 or higher.

PC1965 TASK MASTER: Powerful yet easy to use project tracking package. With it you can create a file of projects, assignments, etc., edit the file, search for specific records, browse through the file, and print reports in any of several formats. Menu driven throughout the program supports most dot matrix printers as well as HP Laserjet compatible laser printers. 512K RAM minimum and hard disk required.

PC1970 QUICK GANTT: Project management tool which will produce a GANTT chart of projects of up to 36 tasks quickly and easily, and allow easy print out and revision of the chart.

PC1980 EMPLOYEE SCHEDULING: PC-SHIFT, a good employee scheduling system. Allows you to schedule by location, by job, and by 15 minute time periods within jobs. You may assign any employee to any time slot. Program allows you to update schedules and job descriptions, and view or print schedules and reports

PC1981 WHO WORKS: Good program which allows the user to make, edit and print 5-week work schedules for Up to 32 persons. Program is easy to use and provides valuable information for all businesses. Prints to Epson, IBM, or HP Laserjet compatible printers.

PC2001 GAMES #1: Collection of great space oriented games. Includes ABM, Astro, Encounter, Lander, Novatron, Spacewar, and Xwing.

PC2002 GAMES #2: Collection of games for your PC. Includes Sopwith, an interesting fighter game, 3D Pacman, Baby, a great game, and Flightmare another great shoot em up flight game.

PC2003 GAMES #3: More great PC games for you to play. Includes Jumpjoe, Alien, Snake, and Starlane.

PC2004 GAMES #4: Bricks, the old breakout game revived, Afghanistan, a good war game simulation, Lemon, an interesting game were you run a lemonade stand. Subchase, a nautical shoot em up..

PC2005 GAMES #5: Archery, a good shoot the arrow at the target game. Packman, a great adaptation of the old arcade favourite. Beast, an interesting maze type game. Rockets, an space shoot em up. Kong, a good version of the famous platform game that supports either keyboard or joystick.

PC2006 GAMES #6: Fire fighter, were you have to save the town from the fire. Paratrooper, a great shoot em up with graphics. Casino yahtzee, a good card game played at casinos around the world. Airtrax, an interesting air traffic controller game.

PC2007 GAMES #7: Qubert, a great graphics game. Caverns of Gink, a good platform game. Polymaze, a good game of intellectual skill.

PC2013 MONOPOLY: Collection of monopoly games for the enthusiasts of the famous board game. Includes full colour graphics version as well as text based version. Great fun to play.

PC2014 DOMINOES: Graphics game of dominoes. Fun to play. Includes documentation on disk and a complete set of rules of the game in a text file.

PC2015 AGITATE: Interesting board game for one to four players. The object of the game is to move all pieces from the home position around the board and into the safe positions that have the same colour as your pieces. Game requires strategic thinking and planning.

PC2020 CROSSWORD CREATOR: Program designed to help you produce your own crossword puzzles. Provides the tools necessary for laying out your own puzzle on screen, adding clues, and even help you solve other pre defined crosswords. Great for cross word addicts.

PC2030 3D CHESS: Excellent graphics chess game suitable for both CGA and Hercules graphics systems. Very playable with the option of a true three dimensional view of the screen. Multiple levels of play to suit beginner through to champion. Allows analysis of play, help as you play and more!

PC2031 ED'S CHESS: Extremely powerful chess game that will work on any system and beat almost any opponent, even commercial chess games. Uses standard computer characters to produce the graphics. This enables the computer to use it's processor to play chess. Excellent on screen analysis at all times.

PC2040 BACKGAMMON: Easy to play, yet very challenging backgammon game. Graphics based it provides command help at all times, allows you to backup your moves, even plays itself.

PC2042 DIAMOND MASTER BASEBALL: Text simulation of the play by play action of baseball. The user is presented with all the situations faced by any major league manager and allowed to execute the options of his choice. So good it was used by a US radio station to simulate a game cancelled due to a strike.

PC2050 TANK BATTLE: Great tank battle game that can be played against the computer or with the aid of a modem between two players on their own computer. You command your tank using the keyboard to destroy your enemy before he gets you. Has multiple levels of play to keep it interesting.

PC2051 STRIKER: Excellent graphics oriented game. You are in control of a helicopter and must navigate through a series of tunnels and complete the mission. Can be played with keyboard or joystick.

PC2052 REFLEX POINT: Graphics game where you have to save earth from the Invids. In order to complete your mission you will use Cyclones, motor cycles that become body armour, and Alphas, jets that become robots. Uses keyboard.

PC2053 QUANTOIDS: Arcade style space action game. Player's viewpoint is the cockpit of an advanced space cruiser. Shoot em up action with a twist.

PC2054 NINJA: Great graphics martial arts game which combines platforms with arcade action fighting. You are assigned to attack a heavily protected fortress protected by black belt karate fighters and the elite Red Guard. Requires CGA video card.

PC2055 RACECAR: Good racing game where you must steer your car along the track and avoid walls, oil slicks, and use the ramps to jump over gullies.

PC2057 LABBITTS & VALDRONS: Good video arcade type game that develops quick reflexes and good imagination. You are in charge of security on your spaceship, guarding it against the attacking Valdrons.

PC2058 SUB COMMANDER: Great game where you are the commander of a submarine sent on mission by head office. You must use your skills. Great graphics.

PC2060 AMERICAS CUP YACHT RACE: Excellent graphics game which allows you to race the America's cup from your PC. Control the rudder, the sails, while you tack and round the buoys with the best. This game has to be seen to be believed.

PC2061 FORD SIMULATOR: Test drive a wide assortment of 1988 FORD automobiles on your choice of four different tracks including touring, slalom, drag strip, and Grand Prix. Great graphics and can even be educational.

PC2062 RACETRACK: Horse race game for up to 10 players. Simulates being at the track. Place your bets, watch the race, and let the computer tell you how much you have won or lost.

PC2063 OFF ROAD RACER: Good graphics game where you must drive your jeep over rocky terrain whilst avoiding the offending motor cycles and shooting obstacles.

PC2064 BERMUDA TRIANGLE: Sail 3 legs of the Bermuda Triangle picking up swimmers and rafters stranded in the water, and finally sail to port. However you must avoid the mystic forces of the Bermuda Triangle. You control your yacht in this great graphics game suitable for all ages.

PC2065 SEAHUNT: Computerised graphics version of then old Battleships board game. Great implementation of the old board game classic with sound and graphics, as well as god game play. Various levels of play enhance the games playability.

PC2066 STOPSIGN: Puzzle type game where the object is to reassemble the sliding blocks from a scrambled position into the STOP sign shown above. Similar to the sliding number blocks game, and good for young and old.

PC2067 JANITOR JOE: Good arcade quality platform game. Joe is the janitor on a space station where the robots have gone berserk and are after you. Joe must find all his keys and escape the space station, or be killed by the mad robots.

PC2068 CLONE INVADERS: Excellent arcade quality space invaders clone. Shoot the invading aliens before they get you. Can be used on any graphics system and supports graphics in CGA, EGA, and even VGA mode, as well as use of a mouse. Good graphics especially in EGA and VGA mode.

PC2080 MINIATURE GOLF: Excellent game of golf with on screen representation of the course and great scoring screen. Play by yourself or set up a tournament. Very addictive and great fun.

PC2081 TEED-OFF GOLF GAME: Excellent graphics golf game. Pick your club and swing, and see if you can become a golf pro.

PC2082A PC PRO GOLF DISK 1: Excellent graphics based 18 hole golf game. You select club, direction, and force of swing to play a close representation of the real game. The course includes water hazards, sand bunkers, wooded areas, and other hazards for realism. With each stroke the player may watch the course the ball takes and see where it lands. Penalty strokes are added under the correct conditions and an updated score-card is available for reviewing at any time, as are help screens and club value lists. Games may be saved to allow you to continue playing. **Requires PC2082B.**

PC2082B PC PRO GOLF DISK 2: Second disk of PC PRO GOLF game. Includes complete 18 hole course. **Requires PC2082A.**

PC2090 PC RAILWAY: Play with a variety of trains on your own PC based railway track using this fun program. Switch tracks and change trains directions as up to five trains move along the track. Gets harder as you go.

PC2091 GORILLA BALLS: You are on a constantly shrinking pool table and you must avoid colliding with the gorilla balls coming from all corners. Game gets harder as you play, and develops your eye-hand coordination.

PC2092 RAILROAD SWITCH CHALLENGE: Great railroad simulation program. Just like having your own model railroad set. The game objective is to move railroad freight cars along simulated tracks to industry locations, and subsequently assemble a departing freight train on the mainline track. Excellent graphics and game play.

PC2100 SLEUTH: Good adventure game where you have to find the murderer. Each time you play the game a new scenario is created so you won't get bored of this game. Includes graphics.

PC2101 CRIME ADVENTURE: Text adventure in which you find yourself in a strange new world where the streets are not safe, and only your courage and imagination can right a great wrong perpetrated before your very eyes. Easy to play adventure for newcomers to adventure games.

PC2102 HAUNTED MISSION ADVENTURE: Text adventure where you have to save the pumpkin man on halloween day from the evil clutches of Lady Windslow whilst ridding the neighbourhood from nasties.

PC2103 ISLAND OF MYSTERY ADVENTURE: Text adventure where you explore a tiny island and seek to find the eleven treasures and find where they must be stored.

PC2104 NUCLEAR SUB ADVENTURE: Text adventure where you are a member of the crew of the USS Nautilus brought back into service to combat the communist threat.

PC2105 TERROR IN THE ICE CAVERNS: Text adventure where you have to find the secret enemy base hidden in the frozen wastes of Antarctica, and capture the plans for the "Death Laser" and return them to your homebase.

PC2106 SPACE QUEST: Adventure game with graphics where you are travelling through space and as you near your destination trouble strikes. Very good game with great graphics.

PC2108 KINGDOM OF KROZ: Graphic based adventure game. You must journey through 25 very dangerous dungeon levels, each riddled with diabolical traps and hideous creatures to seek the Amulet of Kroz.

PC2109 SOUTH AMERICAN TREK: Educational text adventure where you must travel through South America as a special investigator for the president. On your travels you have the opportunity to learn about South American geography.

PC2110 BRAINSCAPE: Excellent educational adventure game which teaches you neuroanatomy whilst you play. You find yourself alone in the brain fighting to find your way, and finding treasures along the way. This game is a must for anyone interested in learning whilst playing!

PC2111 DUNGEONS & DRAGONS: Classic rendition of the fantasy role playing adventure game. Text based.

PC2112 MAROONED: Adventure game where you are the survivor of a crash landing on a hostile alien planet. You must determine how to survive.

PC2113 PLEASURE DOME: Adventure game. You move around the pleasure dome. To do this you cast spells along your travels.

PC2114 AMULET OF YENDOR: Adventure game with graphics. Role playing game with 20 levels where you combat monsters and magic. Good for D & D fans.

PC2115 PHANTOM'S REVENGE: Adventure game where you are locked in a prison and you seek to escape and seek the treasure of the phantom.

PC2116 SAM SPADE: Detective game where you play the part of Sam Spade, the cheap private detective whose mission it is to solve a case by visiting a number of places around town shown on a map onscreen.

PC2117 COMBAT: Text adventure game that uses graphics when you have to fight the monsters. Your task is to rescue the princess from the dungeon and take her to safety.

PC2118 RED PLANET ADVENTURE: Text adventure where you are sent to Mars to learn the fate of a colleague who was lost there 10 years earlier to search for Martian treasure. Advanced adventure game.

PC2119 ENCHANTED CASTLE: Adventure game where you are captured in a castle with over 100 rooms and you must escape. However you must also find the Star Diamond and the beautiful princess, and also destroy the castle as you escape.

PC2120 NIOSA: Graphics based adventure game. You are at the San Antonio Fiesta where you have to eat, drink, and investigate as much as you can to find your friend and be home before midnight.

PC2121 DUDLEY DILEMMA: Award winning adventure game. You play the role of a Harvard student living in Dudley House in his quest for knowledge, adventure, and a diploma. Very good text adventure game with touches of humour.

PC2122 RANADIN: Graphical fantasy adventure game which engages you in the struggle to free a group of islands from the clutches of evil creatures. The game uses full screen graphics to simulate your surroundings. Both combat and sorcery play a major role in your quest.

PC2123 FALCITY: Graphical adventure game wherein you take the role of a private investigator trying to solve a case in a district of a fictitious city. Full screen graphics are used to simulate your surroundings as you explore the streets and buildings of the game's city environment.

PC2124 ARCHER: Archer is an adventure/action game wherein the player fights the mystical enemies of a fantasy land with a new found rapid-fire crossbow. The game's action progresses screen by screen, with hundreds of screens to explore.

PC2125 CRUSADE ADVENTURE: Text adventure game where you play the role of Godfrey de Goodheart, a bold, but impoverished knight. King Frederick III has dispatched you to rescue his only daughter, the beautiful Princess Ann, from the dungeons of Baron von Evil's castle. Your quest will be filled with peril. The seven lone knights who were sent previously on this crusade all vanished without a trace. If you are to succeed where so many others have failed, you must use all your strength, cunning, and luck.

PC2126 ODIEUS' QUEST: Text adventure game where you play Odieus, son of Odielle of the ancient Winwood family. Coming from a long line of sorcerers and enchantresses, you undertake to preserve your ancestral traditions. However your bitter archenemy Blackwing son of Blackfeather has deviously contrived to separate you from the most important instrument of your field, the magic flingshot. You must reclaim it, and survive.

PC2127 EVETS: Role playing computer fantasy adventure game. Evets creates a drama where the game player(s) are in a world of animated mythology. Each player is a roguish character living by his wits who attempts to challenge the fabulous spirits, sprites and monsters of folklore. Players explore endless labyrinths and dungeons in search of treasure and glory.

PC2180 LOVEFIRE: Branching story program described as a cross between a novel and an adventure game. You get to make decisions about the way the story develops. The author claims this is for women.

PC2190 JOURNEY ADVENTURING SYSTEM: Excellent adventure writing program which includes adventure compiler and interpreter. You write your own journey based adventure in any number of rooms. Comprehensive manual on disk to help you.

PC2200 BRIDGEPAL: Contract bridge for one or two players with complete bidding, play and scoring, and bidding help for beginners. Also has best hand option to increase offensive play.

PC2201 KLONDIKE SOLITAIRE: Graphics implementation of the card game solitaire with a number of different options. Suitable for colour or monochrome monitors.

PC2202 BLACK JACK TUTOR: Blackjack game which actually helps you improve your blackjack game. You play against the computer and you can work on new tactics and strategy in your play. You can also chart your progress in graphic format. Of course if all this is too much you can just play blackjack with it as well.

PC2203 LAS VEGAS CRAPS: Good craps game that brings the casino to your computer. Very accurate simulation of the famous dice game which allows up to 40 different types of bets and even provides on screen help.

PC2204 LOW-BALL: Variation of the video poker game where the lowest hand wins. You bet to lose so to speak. Interesting and fun to play.

PC2205 MAHJONG: Excellent Australian written program of the old Chinese card game. Excellent graphics in full colour on colour monitor. Works great on CGA or EGA monitor but does not work if your PC has a Hercules monochrome graphics adapter.

PC2206 EUCHRE: Computerised version of the Euchre card game with Basic source code. Uses only cards from 9 to Ace and allows four people to play.

PC2207 CARD WAR: Card game designed for young children. Computer deals out cards and highest card shoots two shots at the opponents fort. If the cards are the same then war breaks out and more cards are dealt. First player to get over 26 cards wins.

PC2208 GIN RUMMY: Excellent computerised adaptation of the old Gin Rummy game. Plays either standard version, Oklahoma, or Cowboy version of the game. You play against the computer, or if you prefer watch the computer play against itself.

PC2209 DRAW POKER: Program allows you to play five card draw poker against the computer. See your cards on screen and bet like the professionals. Provides challenging game for the serious player as well as helping the weaker players sharpen their skills.

PC2210 PONTOON: Good pontoon game with a difference. This game can be loaded as a memory resident pop-up program, so whenever you get bored and feel like a game of pontoon, hit the hot key and play,, and when the boss watching just press a key and away it goes.

PC2211 TOMMY'S 21: Good version of a wise cracking computerised Blackjack dealer. Gives you the option of playing standard Blackjack, or the variants Flapjack, and Macao, all fully explained in the documentation. Good game play and lost of fun.

PC2212 CRIBBAGE PARTNER: Program provides a realistic representation of the entertaining game of cribbage. The program substitutes computer simulation for the cards, pegs, and board of the actual cribbage game. Shuffling, dealing, and bookkeeping are done automatically, so you can concentrate on the strategy of the game. Also included are the rules of cribbage for those not familiar with the game.

PC2213 CANASTA: Computerised implementation of the South American card game Canasta. The computer acts both as an opponent and a tutor helping you improve your game as you go. Instructions on the game itself are included.

PC2214 7 STUD: Play 7 card stud against 1 to 7 other players, including the computer. You can set your opponents skill level from beginner to expert, then play real poker against them. The computer players bet, raise, fold, and even bluff. You can set the betting limits, maximum raises, and players stakes. You can play to improve your skills, or just for fun.

PC2215 VEGAS PRO JOKERS WILD: Video Poker game for your PC, similar to the games seen in many hotels. Bet on your cards like a pro, and see how much you can win, or lose. Help is available on screen at all times.

PC2216 YANKEE 21 BLACKJACK: Serious blackjack playing program. Designed to provide a very challenging game this program uses the Stanford Wong Hi Lo theory to try to outsmart you. Program also provides the option of teaching you the advanced concepts of blackjack play. Good for blackjack players of all levels.

PC2220 YAHTZEE: Great computer implementation of the traditional dice game. The object is to finish the game with the highest score. You can play against the computer, or against Up to 5 other players as well as the computer. The program uses sound and graphics to great effect to maintain the excitement in the game. Good for all ages.

PC2221 SHUT THE BOX: Interesting dice based game where players take alternate turns trying to get the highest score possible shutting numbered doors matching rolled dice. Very contagious type game which is ideal for all ages.

PC2300 WAR ON THE SEA: High level strategic and tactical simulation of typical World War II naval campaign. Using your skill and strategy you refight some famous battles.

PC2301 GALACTIC EMPIRES: Strategy game where the object is to try to control the most planets within a specified period of time. To achieve this each player is given a home planet with an initial number of ships to be sent out to conquer other planets.

PC2302 EMPIRE 5: Simulation of a full scale war between two emperors, the computer and you. The object of the game is to destroy your opponent. Both you and the computer start with one city, the rest is up to you.

PC2303 AFRICAN DESERT CAMPAIGN: Two armies contest for supremacy in the African desert. Your object is to destroy your enemy before he destroys you. Good war game with on screen map, and easy to use menu operation.

PC2304 RISK: Computerised version of the board game of world strategy and world domination. Allows up to six players including the computer as a player. Displays the full map of the area on your screen.

PC2305 DULLES TOWER: Air Traffic Control simulator that provides a realistic representation of the responsibilities incurred while really working in an airport control tower. Requires CGA video card or adapter.

PC2306 FRIGATE: Strategic game that pits you against a Soviet fleet of vessels. The object of the game is to destroy as many Russian ships as possible whilst avoiding your own destruction. At your disposal you have radar, sonar, jamming equipment, anti missile capabilities, and three type of ordinance.

PC2307 TACTICAL STARSHIP SIMULATOR: Simulation of a tactical starship simulator. You actually have the feeling that you are commanding a real starship, against real enemy captains. Much better than the old "quadrant-sector" type games.

PC2308 BASSTOUR: Fishing tournament game in which you have complete control of a fully rigged bass boat with all the latest equipment, and your aim is to catch as many fish as possible. Excellent graphics suitable for all graphic video adapters.

PC2309 STAR TREK: Graphics based implementation of the famous star trek game. Each player starts with a starbase and up to 12 starships. The object is to map the galaxy, discover planets which have energy and other goods, whilst fighting the enemy.

PC2310 SECOND CONFLICT: Interesting strategy game set in outer space in the future. The aim is to unify the Altair system, but much stands in your way. Not only must you meet your enemy in combat, but you must also keep the morale of your own forces high, and keep starship production high. Good thinking persons game.

PC2311 AIR TRAFFIC CONTROL SIMULATION: You are an Air Traffic Controller. It is up to you to keep planes from crashing into each other. The radar screen shows you the incoming and outgoing flights, but you have control of them. Very realistic game with synthesized speech for a more realistic touch.

PC2350 OILWELL: Game of strategy and luck for one player. You have just inherited an oilwell from a rich uncle. You must take \$50,000, a single oilwell, and a mortgage and use your skill to increase your worth to 3 million in order to pay off the mortgage.

PC2351 MASTER THE MARKET: Fast moving stock market game for 1 to 10 players that closely simulates real market conditions. Players buy and sell from among 10 blue chip stocks to see who can accumulate the most wealth.

PC2352 BIG RIG: Simulate the problems facing a long-haul truck driver from the comfort of your computer chair. See if you are able to make a living hauling freight across the country.

PC2353 MEGAGOPOLY: Great investment strategy game. You inherit \$100,000 and you must obtain financial independence. Test your investment and economic skills while having fun.

PC2500 AIRPLANE CONSTRUCTION KIT: Excellent program that allows you to print the folds necessary to produce your own paper planes. More than that will even decorate your plane for you for that extra touch of realism. Great fun!

PC2600 EGA GAMES #1: Games designed specifically for those with an EGA system preferably on a AT class machine. This disk contains ALDO, a graphics game of the "ladders and ramps" variety with great graphics, and EGAROIDs, a good asteroids type game with excellent graphics. Requires AT or compatible.

PC2650 EGA TREK: Excellent Star Trek game designed specifically for those with an EGA monitor. Takes full advantage of the great graphics capabilities of an EGA system as well as great game play.

PC2651 EGA AIR TRAFFIC CONTROLLER: Air traffic controller simulator for EGA systems. The game is based upon Chicago's Midway Airport. You are presented with a computer enhanced radar screen. Takes advantage of the graphics of your EGA system to provide a high quality simulation. Requires EGA video card and monitor.

PC2652 EGA SPACE FLEES: Good EGA quality arcade space shoot em up suitable for EGA for VGA systems. The aim of the game is simple, shoot down as many space flees as possible before they get you. Requires EGA card and monitor.

PC2660 CAPTAIN COMIC: Excellent arcade game for those with EGA system. You are Captain Comic, galactic hero. Your mission is to recover 3 treasures from the planet OMSOC, which have been stolen and hidden somewhere on the remote planet of Tambri. Great graphics and game play. Requires EGA video card and monitor.

PC2661 CUNNING FOOTBALL: Dynamic, interactive menu driven football game for EGA systems. Simulates a real American football game as closely as possible. Can be controlled by keyboard, joystick, or mouse. Requires EGA video card and monitor.

ADULT GAMES

PC2800 ASTROTIT: Great arcade type game for adults. You must destroy the falling objects as they come towards you. However you have to see them to believe them. Excellent graphics and great fun.

PC2801 BAD-BAD: Sexually oriented graphic adventure game. Avoid your girlfriends relatives whilst having a good time. Good fun but not for the young ones.

PC2802 SOFTPORN: Sexually oriented adventure game where you enter the characters names and attributes to make it a bit more interesting, and realistic

PC2803 X RATED WHEEL OF FORTUNE: Fun spin the wheel and find the word which you won't see on the TV version of this game.

PC2804 LUCKY: Fun game for heterosexual couples who want to spice up the sex life. Guess numbers and computer decides what you should do. Definitely not for the prudish!

PC2805 MADAME FIFT'S WHORE HOUSE ADVENTURE: Text based adventure game with concealed goals. Interesting and not too dirty.

PC2806 FRENCH: Adventure game based in a french warehouse. Has some interesting graphics. Find your way out if you want to, but make sure you "look" at all the girls.

PC2807 BONZO-WARE: Collection of adult games including one and two player trivia, adult trivia, adult poker, and the poker machine. Designed to be played with a partner these games are fun, but a little dirty.

PC2808 INTERSEXION: Fun program for broad minded adults. Similar to Monopoly but with a definite sexual bent. Properties are bought and sold, as in the classic board game, and money is won and lost, but there the similarities end. Choose the level of naughtiness of the program.

PC2850 ANIMATED JIGGLE: Very good graphics demonstration of a girl jiggling her breasts on screen. Well animated for the connoisseur of computer graphics. Includes source code in C.

UTILITIES

PC3050A MULTI USER/TASKING SYSTEM DISK 1: VMIX386, the latest version of the VMIX family will work on any processor from 8088 and 8086, to 80286 and 80386 chips. Enhanced to take advantage of protected mode in the 80286 and 80386 chip, this program provides an excellent multi user system, allowing you to add dumb serial ports to your PC and run programs on them, as well as multitasking. Requires PC3050B.

PC3050B MULTI USER/TASKING SYSTEM DISK 2: Second disk of VMIX386 program. Includes comprehensive documentation on disk. Requires PC3050A.

PC3060 DOSAMATIC MULTI TASKING: Great program which can act as a easy to use DOS shell and also provide you with multi tasking on your PC. Allows you to run a number of programs simultaneously and fully utilise your computer.

PC3070 WEAK LINK: Program allows you to connect two computers together via their RS-232 ports and transfer files at speeds up to 15 kbaud. Good for transferring files between computers with different size drives.

PC3071 EQUAL PARTNERS: Excellent software solution to the problem of sharing data between 5 1/4 inch floppy based PCs and the new IBM PS/2, laptops, and other machines using 3 1/2 inch floppy disks, or transferring files between two PCs without transferring media. Equal Partners addresses the problem by using inexpensive RS-232 serial adapters and software device drivers and communication programs which allow one PC to use the physical devices of another PC just as any normal device.

PC3100 POWER MENU: Great menu program for PC designed to make access to your programs easier without being subjected to DOS. Only uses 2.5 Kb of RAM when running your applications. Comes with comprehensive documentation on disk.

PC3101 THE NAVIGATOR: Hard disk menu program that allows quick and easy access to any executable program on your drive without taking up much system memory. The program also keeps a log of your work, lets you password protect your system, provides on screen time and date, allows temporary DOS access, and even supports a mouse.

PC3102 PROGRAM WIZARD: Menu program for both hard disk and floppy disk users which allows single keystroke entry to programs. Also includes an on screen clock and screen saver that turns off your screen if the keyboard is idle for more than three minutes.

PC3103 OVERVIEW: Excellent Dos Shell file manager for hard disk users. It enables you to carry out routine file commands easily as well as providing a tree directory of your drive, multiple window access to up to six directories, a file view function, and convenient on line help at all times. The program does not use much memory and can utilise expanded memory if present.

PC3104 TREEVIEW: Good hard disk and file maintenance utility program. Gives you simple and straightforward commands for manipulating your files, and provides a directory tree view of your hard disk subdirectories and files.

PC3105 GALLERY: Unique DOS menu system and file manager that employs a graphical interface. You can easily create your own menu, selecting an icon for your application from the library of pre drawn icons. Also the file manager uses friendly and easy to understand icons to make DOS friendlier. Excellent for DOS newcomers, and experienced users alike, and will even work on most networks.

PC3106 MICKEY MENU: Quick, easy, mouse driven system for accessing Up to 500 applications on your PC. This program lacks many bells and whistles, but it is fast and efficient, and allows you to select programs using your mouse.

PC3107 STILL RIVER SHELL: Enhanced MS/PC-DOS environment. The program allows the user much greater efficiency than standard DOS. Typical DOS functions such as finding, copying, moving, deleting, and listing files and directories can be done with just a few key strokes. You can tag file for batch processing, search for files on a hard disk, or for text within files, display graphically the directory tree structure, protect against accidental deletion or copying over, and much more.

PC3108 WINDOW MENU: Sophisticated menuing system utilising state of the art screen windowing to organise your computer system and display the applications, programs, and commands you use for your access. You see your menu as you build it, including menu titles, options, colours, and selections. Point and click capability with mouse. Up to 105 selections per menu categorised under up to 7 window titles across the menu bar. You can also chain to other menus, allowing an unlimited number of menu options. Password protection can be enabled, and parameters can be passed onto programs on execution. On screen help is available, and the program even supports networking.

PC3109 COMMAND POST: Microsoft Windows application designed to allow users to easily personalise the MS-DOS Executive control window. Program allows users to easily add menu and dropdown menu items to the main MS-DOS Executive menu bar, and to execute desired applications when a menu item is selected. Also provides file management features and a directory tree as well as screen blanking, window arranging, and more. Requires Microsoft Windows.

PC3110 CHOICE: Simple multi purpose menu program that can be used to select alternate CONFIG.SYS files and reboot the system and select additional .BAT files to be automatically run after AUTOEXEC.BAT.

PC3111 WINDOWS DESKTOP: Microsoft Windows application that allows you provide a friendly user interface for MS Windows applications and files. Program allows you to create custom menus with meaningful 40 character descriptions of applications and data. Also provides faster access to applications and data by building menu items with the complete path to your application or data. Easy to use, and great enhancement to Windows. requires Microsoft Windows.

PC3120 IMCAP SCREEN CAPTURE UTILITY: Program designed to allow you to capture your PC screen image, review it, store it, and use it for desktop publishing or other uses.

PC3130 PSEARCH: Good file/text search utility. Will search a disk drive for a specified file or search any kind of file for text. It will also scan a non text file and display any readable text embedded in it. Also includes number of options to operate on files once found.

PC3140 FILE FRIEND PLUS: Memory resident file manager allows you to find and manage your files quickly and easily. View files on up to ten different disks or subdirectories, sort them, transfer them, manipulate them, and also keeps log of last twenty commands entered into system.

PC3145 ON CALL TSR MANAGER: Program allows you to greatly expand your access to memory resident TSR software, as well as enhance the capabilities of most other applications. Allows you to load a number of memory resident programs and choose which one is to be loaded to memory at any one time. Those not in use at a particular time are stored to disk or expanded memory if available.

PC3150 PCOPY: Good disk utility that replaces DOS copy command. Program creates and updates directories, merges directories, moves files, fills disks when copying from hard disk, and much more. Very useful.

PC3151 TWINCOPY: Copy program designed for making back up copies of most copy protected programs for archival use only. Does not cover all copy protection schemes but fairly powerful.

PC3175 BACKUP MAESTRO: Program designed to make your hard disk backup fast and easy. Menu driven program keeps floppy drive running during backup to increase speed. Also provides password security and support for most networks.

PC3180 LCG REMIND: Utility program designed to remind you when it is time to back up the files on your hard disk, and to help automate the process. Allows you to automate any task based on the day of the week, day of the month, or the number of days since last executed. When triggered the program can be instructed to take a variety of actions. It can run another program directly, it can simply display a reminder message, or it can even offer a multiple choice question and act based upon the response.

PC3210 DISK EDITOR: Utility to allow you to look at what's on your disk and make changes to what you find there. Look at contents of a disk file or a disk sector in either ASCII or hexadecimal. Also included is FM a file modification utility useful for patching and changing programs.

PC3211 MASTERKEY: Great utility which allows you to access your MS-DOS disks. It includes a disk editor, file editor, file manipulator, and more. Allows access to hard disks, any size floppy disk, and RAM disk.

PC3212 DISK JOCKEY: Program that allows you to read any type of disk for editing, even non-DOS and protected disks. Unscramble disk directories, transfer sectors, read any size sector, and more.

PC3213 ANADISK DISK UTILITY: Powerful general purpose package to analyse, inspect, edit, repair, and copy floppy diskettes. Supports all DOS floppy diskette types, and allows you to easily change disk sectors, edit any information on the diskette, repair corrupted sectors, copy almost any disk, and much more.

PC3215 MAXI DISK FORMATTER: Good program which allows you to format your disks to store more. Standard 360K disks can be formatted to 420K, 720K disk to 800K, 1.2M disks to 1.4 M, and 1.44M to 1.6M. In most cases no special device drivers are required to access these disks.

PC3216 DISK DUPLICATOR: DUP is a duplication utility designed to let individuals and companies create multiple copies of diskettes. The program reads the source diskette, produces an image on your hard disk and allows you to produce multiple copies without having to re read the source diskette. The program formats, writes, and verifies in one pass, has the option of incrementing serial numbers during production, and can use any type of floppy drive.

PC3220 RAMTEST: Program designed to help identify RAM problems, and as part of a periodic maintenance program for your PC. Provides an exhaustive test of your PC including the base RAM, expanded memory, and extended memory in AT class machines.

PC3221 ADJUSTABLE RAM DISK: ADJRAM, is a RAM disk program with a difference. This program allows you to set up a RAM disk and then change its size at any time without rebooting, and without losing any information in your RAM disk. Supports standard RAM and LIM Expanded memory. Source code in C is included.

PC3225A QUICKCACHE DISK 1: Excellent full powered disk caching program to help speed up disk read and writes. Can use standard memory, as well as extended and expanded memory efficiently. Uses a sophisticated and efficient algorithm to speed up disk access up to ten times or more. Requires PC3225B.

PC3225B QUICKCACHE DISK 2: Second disk of QUICKCACHE program includes comprehensive documentation. Requires PC3225A.

PC3230A CP/M TRANSFER UTILITY DISK 1: Excellent CP/M to DOS transfer utility and CP/M emulation program for your PC. The program actually lets you read a large number of standard CP/M formats on your PC. The formats include Altos Series 5, Ampro, Bondwell, Coleco ADAM, Compustar, Cromenco, DEC, Eagle, Epson QX, Fujitsu, Heath, HP, Kaypro, Morrow, NCR, NEC, OKI, Osborne, Otrona, and many more. Can easily be configured for almost any disk type. You can transfer files from CP/M disk to a dos disk and vice versa, display disk directories and files, and more. The CP/M emulator allows you to run most CP/M programs on your PC. Requires PC3230B.

PC3230B CP/M TRANSFER UTILITY DISK 2: Second disk of CP/M transfer utility package. Requires PC3230A.

PC3251 CATDISK: Disk cataloguing system that organises a "super directory" of all your diskette files in alphabetical order and tells you what diskettes they are on in a single glance. Even includes files that are within an .ARC or .LBR files. Also will scan and include file within subdirectories.

PC3252 WSS DISK INDEXER: Indexing program that allows you to produce a database of files on your disks, both floppies and hard disks, and then sort and print the information according to your criteria.

PC3270 SOFT-TOUCH: Keyboard utility that allows you to programme individual key combinations with user defined keystrokes or macros. Also allows you to combine these keystrokes into even larger macros. Even allows you to automatically enter time and date and much more! Up to 90 key combinations with 3000 maximum keystrokes are allowed.

PC3271 HURRY KEY: Sophisticated keyboard turbocharger for your PC. Provides a toolbox of new keyboard features which you can use to choose different repeating speeds for different characters, adjust the repeat delay factor, and the acceleration rate, and prevent cursor run on.

PC3290 STIKME: Label printing program with options for expanded and compressed printing, automatic centering, underline, and even italics if your printer supports it. Layouts can be saved for future use.

PC3291 PRTLABEL: Powerful and flexible label printing program. You can specify label size, number of labels across, and printer model. Over 50 printer configurations are included, and you can easily produce your own printer specific file. You can use fonts such as condensed, expanded, and italics, and can even print borders and serial numbers on your labels.

PC3350 POP-TRAIN: Pop-up help system that you can customise to display specific help screens depending on the page and field location of the cursor. Particularly useful as a training aid for new users, or those designing applications.

PRINTER UTILITIES

PC3400 LQ: Great memory resident printer utility which allows you to produce near letter quality print on inexpensive dot matrix printers. Also lets you use different font sets on your printer with four fonts available at any time. Suitable for Epson, Star, Citoh, and IBM Proprinter.

PC3401 BOOKLET: Useful program that divides text files into even-page and odd-page files. These files can then be printed back to back to form pages similar to pages in a book. When assembled these pages form an easy to read book of any document file. We use it for printing all our documentation to make life easier.

PC3402 MICROTEXT DOCUMENT CRUNCHER: Excellent program that allows you to condense printed text so that Up to 4 pages can be printed on a single sheet. Works with almost any dot matrix printer, as well as HP Laserjet printers. Program allows for page preview, as well as a number of advanced features, add margin for hole punching, and more.

PC3405 VERSATILE PRINTER SETUP: Printer setup program that can be adapted to almost any available printer. Includes setup for a number of printers including Epson, IBM, Gemini, NEC and HP Laserjet. Very useful.

PC3410 FONT GENERATOR: Good program for users of IBM Proprinters or Epson FX compatible printers. Allows you to generate your own font set using the editing functions of this program. Includes three fonts as examples, italics, roman, and scientific fonts.

PC3411 BRADFORD: Printer utility that allows you to print ASCII or Wordstar in very high quality using a number of different fonts on Epson FX, IBM Graphics and Proprinters, and Star Gemini printers. Comes with over forty fonts including Greek, Hebrew, Jazz, Orator, Nostalgia, and more.

PC3415 ON-SIDE: Sideways printing program suitable for Epson and IBM Graphics compatible dot matrix printers. Program gives you a choice of several font styles.

PC3420 EPSON LQ SERIES: Program lets you set up any of the 224 different print styles from your Epson LQ series printer using an easy menu system.

PC3421 EPSON LQ FONTS #1: Collection of fonts for those with an Epson LQ or compatible printer. Fonts include Broadway., Emerald, Diamond, Chicago, Colossal, Frankfurt, and many more. Over 30 fonts in all!

PC3422 EPSON LQ FONTS #2: More great fonts for the Epson LQ or compatible printer. Includes Gothic, Ninetys, Opal, Outline, Pearl, Penpal, and many more. Over 30 fonts in all!

PC3429 LQ FONT GENERATOR: Program allows you to create and edit downloadable fonts for EPSON LQ series 24 pin dot matrix printers. Also included are a number of sample fonts for use with the program, or for downloading to your printer, as well as a utility to help download fonts to your printer. Fonts included are CAPS, SANSERIF, SCIENCE, SHADOW, STENCIL, GOTHIC, and SCRIPT.

PC3430 SUPER-SPOOL PRINT SPOOLER: Powerful, multi function print spooler which can perform many sophisticated functions. It permits buffer sizes up to the maximum available RAM, printer redirection, single-shot use, and many other options.

PC3450 CLASER: Excellent utility for those with HP Laserjet or compatible laser printer. Memory resident program it allows you easily choose the font you want your printer to use including cartridge fonts, provides control over printer ports to allow serial port support, perform graphics screen dumps on the HP, and emulate an Epson FX printer for those programs that don't support HP Laserjet.

PC3451 CTABLE: Program designed to help HP Laserjet users use downloadable soft fonts with their word processors. Supports Word, PC Write, and XyWrite, but can be configured for other programs including WordPerfect. Enables you to get full use out of soft fonts from your laser printer.

PC3452 LOADFONT: Excellent utility program for those with HP Laserjet compatible laser printer. Reads a directory of soft fonts and allows you to select those you want to download to your laser printer, or allows you to produce a batch file to load the fonts at any time. Can handle Up to 200 soft fonts, and comes with 7 soft fonts on the disk.

PC3453 OVERLAY: Program converts a print file to an overlay file for HP-Laserjet compatible printers. An overlay will place the print image on every page without the need to re send the file to the printer. This is great for applications such as letterheads, graphics, logos, and text.

PC3454 SOLIDFONT: Program converts any HP Laserjet soft font to a solid, three dimensional typeface. The character-height, width, and displacement are adjusted to take into account the extra thickness. Useful for producing headline fonts.

PC3460 FONT FILTERS: Great program for owners of HP Laserjet or compatible printer. Takes any soft font and transforms into either a hollow outline form of the font, or a 3-D effect font with shadowing. If you don't have postscript this will allow you to do some of the things more expensive postscript printers do.

PC3480 POSTSCRIPT TRANSLATOR: Program allows you to prints standard ASCII files to a Postscript printer. It can thus provide Postscript support to the many programs which currently do not support Postscript printers. Also allows you to print directly to a Postscript printer from DOS. Type font and size can be selected as can page orientation.

PROGRAMMING

PC3500 P-BASIC INTERPRETER: Excellent BASICA compatible Basic interpreter. Suitable for all IBM compatible machines including AMSTRAD. If you did not receive a BASICA compatible Basic interpreter with your machine then you need this!

PC3510 WASM ASSEMBLER: Assembly language compiler that takes a standard ASCII text file containing 8086 instruction mnemonics and produce an executable COM file. Supports full range of 8086 instructions and addressing and produces executable code that does not require linking.

PC3550 SPL: Structured Programming Language, a hybrid mix of structured BASIC with PASCAL style programming architecture. Intended for experienced users.

PC3551 FIFTH: A new programming language based on Forth and yet more powerful and easier to use. Includes compiler, editor, dictionary editor, and interactive environment. Fast compilation and memory efficient.

PC3552 AUGUSTA ADA: Subset of the Department of Defense computer language ADA. Based on an interpreter which implements a stack oriented virtual machine. Includes a compiler with source code in Basic and Turbo Pascal.

PC3553 SNOBAL 4: Entry level version of the SNOBAL 4 language that includes the entire Bell Labs SNOBAL 4 language except for real numbers and external functions. The total size of the object file cannot exceed 30K, however SNOBAL 4 code is usually very compact being five to ten times smaller than the equivalent code in C or Pascal.

PC3555 PASCAL COMPILER: Facilis, a p-code compiler for an extended subset of Pascal. Of interest to students of Pascal and people interested in how compilers run. Does not handle I/O routines.

PC3556 SMALL C COMPILER: Good C subset language to help you learn and use the C programming language. Contains most features of full C packages.

PC3557 SMALL C INTERPRETER: Fully interactive interpreter for Small C language. You do not need to compile your C program to see it run. Very useful for debugging C programs.

PC3558A PERSONAL C COMPILER DISK 1: Fast, powerful C compiler. Full featured compiler suitable for programmers of all levels. Requires PC3558B.

PC3558B PERSONAL C COMPILER DISK 2: Second disk of Personal C Compiler package contains comprehensive documentation. Requires PC3558A.

PC3559 XLISP: Experimental artificial intelligence programming language combining some of the features of Common Lisp with an object orientated extension capability. Good for programmers wishing to learn Lisp, or object oriented programming, and those interested in Artificial Intelligence.

PC3580 WINDOW BOSS: Powerful package designed to enhance and accelerate the development of system and applications programs. Allows you to incorporate pop up windows, pull down menus, status lines, on line help, and automatically sense the video card and more!

PC3581 C WINDOW: Great collection of functions that give windowing capability to the C programmer on a PC. Designed for Microsoft Lattice C.

PC3585 C2DBASE UTILITIES: C2DBASE is a collection of utilities for C programmers to enable them to use dBase files. With the C2DBASE functions a C programmer can use the files created by Dbase III outside the dBase environment, extract file statistics without dBase, write C programs that bring information into the dBase environment, display memo fields, perform very fast keyphrase searching through memo fields, and much more.

PC3586 C DATABASE MANAGEMENT: Complete database development kit for C programmers. It is based on the NETWORK database model and uses the ISAM methodology for key file management. Program also utilises the concept of Data Definition Language (DDL) to allow the developer to easily design and modify their databases. Compatible with Microsoft C and Turbo C large memory models.

PC3587 MULTI TASKING KERNEL FOR C: CTASK is a set of routines that allow functions in a C program to run concurrently. This is accomplished by giving each defined task-function a slice of the processor time, switching tasks on each system timer tick, or if the task is waiting for an external event to occur, or is synchronising with another task. This gives the illusion of simultaneous execution of the tasks if switching is fast enough, and no task excessively blocks system resources. Microsoft C and Turbo C are supported.

PC3600 @LAST: Pop up utility that provides an ASCII table, a function for peeking and changing the contents of RAM, a display of keyboard scan codes, a moveable on-screen ruler, a printer page eject, and a toggle between fast and slow screen writing. Uses less than 6k of RAM.

PC3650 EGA FONT EDITOR: Group of programs designed to make the use of EGA systems easier. Include a EGA screen font editor, a number of fonts to use on a EGA or VGA system, as well as a number of useful EGA utilities.

PC3700A TURBO C TUTORIAL DISK 1: Good tutorial program on C programming in general, but more specifically for Borland's Turbo C language. Contains one disk of text files on how to program using the language, and a second disk containing a number of example source code files related to the text. **Requires PC3700B.**

PC3700B TURBO C TUTORIAL DISK 2: Second disk of the Turbo C Tutorial program. **Requires PC3700A.**

PC3701 TEACH YOURSELF C: Great tutorial programming on programming in C. Starts from the basics of C programming and covers areas such as data types, the use of strings, formatting of C programs, the use of C functions, the use of pointers and arrays, switching, and much more.

PC3710A PASCAL TUTORIAL DISK 1: Introductory tutorial on programming in PASCAL. Contains disk full of text files on how to program using standard Pascal and Borland's Turbo Pascal. Second disk contains 84 Pascal source files discussed in the text tutorial. **Requires PC3710B.**

PC3710B PASCAL TUTORIAL DISK 2: Second disk of Pascal Tutorial program. **Requires PC3710A.**

PC3711 TURBO-LESSONS: Tutorial on Turbo Pascal which takes you from basics to advanced programming concepts in Turbo Pascal, and includes a number of sample files.

COMMUNICATIONS

PC3900A BOYAN DISK 1: Impressive new communication program. Its flexibility, speed, and ease of use make it suitable for all modem users. Supports on line help at all times, status line which informs you of call elapsed time, built in file manager which allows you to manipulate files whilst using the program. **Requires PC3900B.**

PC3900B BOYAN DISK 2: Second disk of the Boyan communications program. **Requires PC3900A.**

PC3901 TELIX: Excellent, easy to use, general purpose telecommunication package suitable for logging onto bulletin boards and file transfer. Supports a number of file transfer techniques.

PC3902 COMMO COMMUNICATIONS: Small efficient telecommunication package for PC use. Compact coding has produced a fully functional general purpose communications package that is less than 21K in size. Ideal for all PC yet takes up small amount of disk and RAM space. Can be run under multi tasking utilities such as DESQVIEW. Includes its own macro processor to give the program great flexibility.

PC3903A KERMIT DISK 1: Good implementation of KERMIT telecommunications system for PC-DOS and MS-DOS. Includes VT-102, and Tektronix 4010 graphics terminal emulation. **Requires PC3903B.**

PC3903B KERMIT DISK 2: Second disk of KERMIT for PC-DOS and MS-DOS machines. Includes comprehensive documentation. **Requires PC3903A.**

PC3905 VIATEL TERMINAL: ITEL, and excellent terminal program for accessing Viatel or any other Videotext type service. Provides support for modems with and without baud rate converters. Supports colour graphics and text.

PC3910 PC-VT TERMINAL EMULATOR: Software emulator that allows IBM compatible PC to function as a DEC VT102 or VT100 Video terminal. Allows communications over serial ports, online help at all times, support for Hayes modems, use of macro keys and more.

PC3920 UNICOM: Communication program designed to be used with Microsoft Windows. Program allows for background communications using Windows multi tasking capability. Provides a number of file transfer protocols, as well as VT52 and TTY terminal emulation, directory assisted dialling, keyboard macros, plus the ability to easily transfer Windows specific data formats such as Excel data, Windows Paint images and more. **Requires Microsoft Windows.**

PC3930A EIS BULLETIN BOARD SYSTEM DISK 1: EIS is a complete remote information manager. The program allows people who own modems to call your modem and download information, send, receive, and reply to E-Mail, operate programs that run on your computer from theirs, view catalogues talk to the system operator, and much more. You can control access to specific message bases, menus, commands, file directories, and even individual files. Up to 999 message bases are supported, with up to 2 billion messages per message base. More than 32000 users are supported, baud rates from 300 to 19200 are supported. The program supports "doors" for PCBoard, RBBS, GAP, Wildcat, and many other systems. **Requires PC3930B.**

PC3930B EIS BULLETIN BOARD SYSTEM DISK 2: Second disk of EIS Bulletin Board System includes comprehensive documentation. **Requires PC3930A.**

GRAPHICS

PC5000A DANCAD3D V2 DISK 1: Excellent 2D and 3D Computer Aided Design (CAD) package. Program can be used from keyboard or by mouse and supports a number of printers and plotters including Postscript laser printers. Supports many features found only in packages costing thousands of dollars. Help available on screen at all times and on screen tutorial also available. Does zooming, scaling, 3D perspective and more! **Requires 640K RAM. Requires PC5000B.**

PC5000B DANCAD3D V2 DISK 2: Second disk of the DANCAD3D package. **Requires PC5000A.**

PC5001 ARTMASTER & SUPERDRAW: Two good graphics programs written in Basic. Both allow you to use keyboard or joystick for editing, and have on screen help. Powerful and easy to use.

PC5010 HP LASERJET GRAPHICS: Fingerpaint, a great graphics program specifically for HP Laserjet or compatible laser printers. Provides 150 dpi resolution, and supports CGA, EGA, and Hercules monitors. Uses keyboard or mouse and has six different fonts each of which is available in 81 different sizes. Also allows full page printing and combining screens to form animation.

PC5011 DRAFT CHOICE: Object based drawing package. Unlike most drawing programs this program uses floating point mathematic algorithms to record details of objects you design. Allows for extremely detailed drawings. Supports Epson dot matrix printers, HP Laserjet, and HPGL pen plotters.

PC5012 IMAGE 3D: Excellent design and modelling program that enables you to create, view, and edit three dimensional wire frame objects and images. Completely menu driven, the program is easy to learn and use, and features versatile commands with emphasis on conceptual design and illustration applications. IMAGE-3D features the ability to create drawings from any viewpoint around your drawing, and uses a simultaneous command architecture that allows you to use several viewpoint commands during the drawing functions. Supports all video modes including EGA and VGA.

PC5015 PC FOIL: Good program that allows you to combine graphics with your word processing documents. Allows you to make effective use of your printer to emphasise your writing.

PC5020 SKETCH-A-COLOR: Good drawing program with a number of advanced features. Allows you to use up to 16 colours on a colour monitor, and has three different resolutions, low, medium, and high. Allows you to paint on screen, write on screen and much more.

PC5025 PC DRAFT II: High resolution pixel oriented drawing and graphing program which accepts input by mouse or keyboard. Also has the ability to capture text or graphics screens, and a host of drawing functions and even the ability to produce slide type presentations from the program. Can save images in format usable by Ventura and Wordperfect 5.0.

PC5035 READMAC: Great program that allows you to read and display MacPaint drawings at an impressive 640x200 resolution on screen and print them on most printers. Includes a number of great demo drawings.

PC5040 SIGNSMIF: Sign printing utility which allows you to produce impressive signs using up to four different fonts in either portrait or landscape orientation on an Epson or compatible printer.

PC5050A PICTURE THIS DISK 1: Excellent Postscript specific drawing package. With this program you can produce resolution independent drawing files for delivery to Postscript compatible printer or imagesetter, either freehand or by tracing "template" screens captured with the companion CaptureThis program. The program produces Postscript files using cubic Bezier curves to construct "vector" drawings which, unlike "bit-mapped" drawings, can be scaled and rotated without degradation. Ideal for desk top publishing. Requires 512K RAM and Postscript compatible printer. **Requires PC5050B.**

PC5050B PICTURE THIS DISK 2: Second disk of Picture this program. **Requires PC5050A.**

PC5051A PC DRAFT-CAD DISK 1: Object oriented Computer Aided Drafting (CAD) utility which is designed to facilitate a variety of drawing and drafting needs. Program stores your drawings as a database of basic drawing elements such as points and lines. This allow you to produce scale drawings up to any size supported by your printer or plotter. The program has built in functions to allow you to draw circles, lines, boxes, arcs, and ellipses. You can add text to your drawing with a variety of fonts. Supports a variety of printers including IBM and Epson dot matrix printers, HP Laserjet and Hp Deskjet printers, and the HPGL plotter language. Drawings can be exported in GEM and WPG format for us in Ventura and WordPerfect 5.0. **Requires PC5051B.**

PC5051B PC DRAFT-CAD DISK 2: Second disk of PC DRAFT-CAD program described above. **Requires PC5051A.**

PC5052A CASCADE DRAW DISK 1: Powerful full featured Computer Aided Design program suitable for all graphics systems up to VGA resolution. menu driven for ease of use this program has all the features of much more expensive programs. Supports mouse for drawing as well as keyboard entry the program. program allows for detailed drawing, with colour option on colour systems. Zooming, panning, grid locking, variable pen width, and much more are supported. Requires 512K RAM minimum. **Requires PC5052B.**

PC5052B CASCADE DRAW DISK 2: Second disk of CASCADE DRAW program includes comprehensive documentation and sample drawing. **Requires PC5052A.**

PC5053 VGA PAINT: Graphics/drawing package that produces screen images in up to 248 colours at once. Fourteen brush shapes and four automatic shapes are provided. Image handling capabilities include sizing, flipping, moving, copying, and saving images to disk. Program require VGA card and monitor, 450 K RAM minimum, and mouse.

PC5070 NUTS AND THINGS: Collection of 96 drawing files for use with AUTOCAD. Most of the files are drawings of various pieces of hardware which are frequently used by designers and drafting personnel. The drawings include nuts, flat washers, screws of various types, etc. Each drawing is an individual "block" and can be called up and positioned by the user to satisfy the requirements of the drawing being developed.

PC5100 BUSCARDS: Good program that lets you print your own business cards using an Epson or IBM compatible printer. Gives you a choice of a number of borders as well as text entry.

PC5110 BADGE-O-MAGIC: Excellent badge and nametag generator for use with HP Laserjet or compatible laser printer. The program can use dBase files to print six badges being printed on a sheet of paper. Five fonts are included with the program. Requires hard disk and HP Laserjet or compatible printer.

PC5200 PRINTMASTER TOOLS: Collection of utilities designed to enhance the Printmaster program available commercially. Enables you to print a listing of icons contained in a library, display the icons on the screen so that they can be captured with a screen capture program, and convert a group of icons into a Windows Paint format for use in desk top publishing packages.

PC5202 PRINT GALLERY: Program designed to read, write, convert, and print PrintMaster, PrintShop, and NewsMaster graphics. Also allows you to view graphics on screen. Good for producing hard copy of your graphics libraries, as well as converting files. Supports all graphics video systems, and can be used with a mouse.

PC5203 PMSLABEL: Label printing program that allows you to use PrintMaster and PrintShop graphics. Program allows you to select the graphic required, view it on screen, print multiple labels with up to 5 lines of text per label, and more. The program is written in Turbo Pascal. Works with compatible printers.

PC5207A PRINTMASTER GRAPHICS NO. 1: Collection of business oriented graphics for use with Printmaster graphics program.

PC5211 PRINTMASTER GRAPHICS NO. 2: Collection of business oriented graphics for use with Printmaster graphics program.

PC5300 ICONVERT: Graphics format conversion program. Allows graphics produced by one program to be used by other programs. Converts to and from PrintMaster, PrintShop, NewsMaster, Newsroom, Fontasy, Macpaint, Windows Paint, and PC Paintbrush format. Allows you to view graphics on screen, and manipulate graphics.

PC5301 GCP GRAPHICS EASEL: Microsoft Windows program for displaying, manipulating, and converting various format files. It is designed to work on any system which is running Microsoft Windows version 2.03 or greater. Uses standard Windows graphics interface for ease of use. Supports mouse and keyboard commands, as well as video up to VGA standard. Program will read, write, and convert Windows Paint, MacPaint, GIF, and PC PAINTBRUSH. **Requires 640K RAM.**

PC5400 OPTICAL CHARACTER RECOGNITION: Powerful Optical Character Recognition (OCR) program. Input can be provided from a HP Scanjet or from a TIFF file produced by any other scanner. It recognizes both monospaced and proportional spaced fonts and adjusts automatically from 8 to 30 point. The program can be trained to learn unrecognised shapes or new fonts if you have a EGA or VGA system, otherwise a graphics card is not specifically required. It can read text at a speed of up to 200 words per minute.

BUSINESS GRAPHICS

PC5600A FLODRAW DISK 1: Full featured graphics editor which has been specially designed to handle symbols easily making it ideal for producing flow charts, organisation charts, electrical schematics, and can also be used as a what you see is what you get graphics editor. Includes libraries of symbols for flow charts and electrical diagrams. **Requires PC5600B.**

PC5600B FLODRAW DISK 2: Second disk of FLODRAW program. **Requires PC5600A.**

PC5610 CHARTS UNLIMITED: Program integrates graphics and text processing into one powerful system to allow quick and easy creation, editing, and printing of flowcharts, organisational charts, floorplans, electrical diagrams, and many more types of charts. Program has flowcharting and geometric shapes that can be resized, and also allows you to create and save your own set of objects, print charts both horizontally and vertically, import from other programs, and much more.

PC5620 EASY CHART: Easy to use program designed to simplify the generation of complex system flow and hierarchical charts. The software reduces the task of creating symbols such as decision boxes, process boxes, listing boxes, and file boxes to moving the cursor to where you want the box to be and pressing a key. Unlike other charting programs, this program does not use graphics to draw charts. Instead it uses characters available in the IBM Extended Character Set. This allows you to store files as simple ASCII files allowing you to easily import the file into other applications.

PC5621 PRONTOGRAPH: Program designed to make the task of producing business graphs easy. It is a "three layered" package because of the way the PRONTOGRAPH images are stored and drawn. At the "bottom" of each image is the graph itself. The graph is entirely defined by the numbers entered and the menu selections selected. The next layer is the Paint layer. This layer is composed of lines and boxes drawn using the paint commands. The top layer is the Write layer. This is additional text that you can add anywhere using the write commands. Graph types are Bar Graph, Line Graph, X-Y Graph, and Pie Graph.

PC5750 BARCODE GRAPHICS GENERATOR: Create barcodes using your printer and this excellent program. Uses the code 3 of 9 system which allows for full alphanumeric coding. Comes configured for IBM Graphics and Epson Graphics compatible printers though can be configured for other printers.

PC5800 PC DEMONSTRATION SYSTEM: Program provides way for you to make program demonstrations, prototypes, and other types of presentations. Includes a screen formatter to create screens for your presentation, a demo maker which allows you to produce a sequence for your screen and provide valid keys to allow your presentation to progress, and a run utility which actually runs your demonstration.

PC5801 SLIDE PRESENTATION SYSTEM: Graphics processor that provides a means for creating sequences of images and sound that may be used for store displays, for instruction, or for business presentations.

PC5810 CONTEXT & SNIPIX: Two utilities for the graphic presentation of information. Context will read ASCII text files and convert them into sequentially numbered BLOAD format files which may be processed with Snipix to superimpose graphic images onto the text for desktop publishing or for preparing posters, cue cards etc. Can also be used for on screen presentations with PC Present.

PC5820 PF PRESENT: Excellent desktop presentation system. When used in conjunction with P-SCREEN allows you to produce screen images and display them as a slide show. The program allows interactive branching based on user selection. Special effects which can be added include animation, sound, exploding windows, and loops. Library files can store up to 100 full or partial screens and are indexed for fast display.

PC5821 P-SCREEN: Program allows you to create dazzling screens in minutes for use with PF PRESENT, save them to screen libraries. P-SCREEN can also be used for producing screens for other programs, as well as producing screen s for your own programs. Supports 25, 43, or 50 line screens, provides easy screen design, and much more.

PC5830 CLICK AND SHOW: Set of two programs used for laying out and then presenting a collection of "slides" or screens in a logical and useful manner. One program is used to design the slide show layout and the "touch areas" on each slide, while the other program is used to "run" the show. In a sense you can think of it as a mouse driven hypertext system for graphical images. Slides can be produced by almost any Windows program and brought in by the Clipboard, or from any Paint program. requires Microsoft Windows and 640K RAM.

COMPUTER HELP

PC6000 PC TUTORIAL: Excellent educational program for those new to the IBM PC or compatible. Covers DOS from simple commands to batch files as well as covering various other aspects of computing in an easy to understand way. Even lets you type in examples to help you learn. A must for new or even more experienced PC users.

PC6001 HELPME WITH DOS: On screen help for most of the important DOS commands. Select the DOS command from the menu and the program provides information on what the command does, how to use it, and even examples.

PC6010 BATCH LEARN: Excellent tutorial program on the use of Batch files to make your computing easier and more efficient. Good follow on from PC6000 this program takes you from simple batch language files to advanced concepts in batch file production.

PC6020 HELP!: Online help reference to DOS commands. Can be used as stand alone program or in memory resident state were it can be called up at any time. very useful for all PC users.

GENEALOGY

PC7301 LINKAGES: Genealogy program based on a card filing type system for ease of you. Has report functions and on screen help.

PC7302 FAMILY 3: Genealogy program which allows you to organise your family tree information and allows you to print it in several ways including descendant charts, ancestor harts, descendant trees, and more. Requires 320K RAM.

PC7303A BROTHERS KEEPER DISK 1: Very comprehensive genealogy program which will help you organise your family tree information, and which will print the information in several ways. You will be able to print descendant charts which show how any one in the file is related to any one else. You can also print ancestor charts, family group sheets, name lists, descendant trees, and customised reports. Requires 384K RAM. **Requires PC7303B.**

PC7303B BROTHERS KEEPER DISK 2: Second disk of Brothers Keeper program includes comprehensive documentation. **Requires PC7303A.**

PC7320 HORSES: Genealogical database for horse breeders. Maintains data records of individual horses, breedings and notes. Provides printing of pedigree charts, list of descendants, and indexing of entries, and support for a number of printers.

EDUCATION

PC8000 AMANDA'S LETTER LOTTO: Simple game for children 18 months and older which teaches them about the alphabet whilst they learn how to use the computer.

PC8001 IQ BUILDER: Good menu driven program which teaches while you play. Includes number skills, analogies, synonyms, antonyms and more.

PC8002 FUNNELS & BUCKETS: Mathematic learning game for children from preschool to early high. Helps improve skills in basic mathematics by making it fun to learn.

PC8003 SAN MATEO DISK #1: Collection of good education programs from the US. Includes mathematics, geography and some educational games. Menu driven. Good for primary school students.

PC8004 SAN MATEO DISK #2: More great programs from the US. Designed for high school students covers more advanced mathematical functions such as prime numbers, trinomials, and equations.

PC8005 ABC: Good program for young children to learn letters, numbers, and also develop computer literacy. Uses graphics and music to keep the child's interest.

PC8006 SPEED READING: Excellent speed reading tutorial for all ages. Evaluates your current reading speed and helps you increase it. Good for all ages.

PC8007 FUN LETTERS AND WORDS: Educational program for pre-schoolers and infant grades. Includes number recognition, counting, grouping, adding and subtracting. Educational value enhanced by the use of animation, graphics, and music.

PC8008 BALLOON SPELL: Educational program to help children improve their spelling. You enter lists of words for the children who are then presented with the words in a number of ways to help them learn how to spell them.

PC8009 SCHOOL MOM: Educational tool for children ages 4 to 14. Its main options are Maths, Art, Music Composition, and Spelling. There are three different maths options. These are addition and subtraction, multiplication and division, and algebra. The program uses a back to basics approach to teaching but also has some interesting aspects that make it very enjoyable. The art option requires a joy-stick, although the rest of the program functions without one.

PC8010 ANIMAL MATH: Cute graphics based mathematics program for the very young. Using animal characters it teaches children to count and simple addition, subtraction, and number sequences.

PC8015 MATH TUTOR SYSTEM: Very good mathematics tutorial system for grades 1 to 6. Lets you Easy to use with built in instructions.

PC8016 FRACTIONS EXTRA: New and easy way to practice reducing, multiplying, and dividing fractions. Interactive exercises provide the immediate feedback proven to help students to quickly learn and master mathematics concepts. The program provides multiple levels of difficulty to allow the student to grow with the program, progress report on the student, on screen help at all times, and easy to use menus.

PC8017 GOOGOL MATHS GAMES: Combination arcade game and maths tutor. The program covers addition, subtraction, multiplication, and division. The games include a jump and run type game, a snake type game, and a space invaders type game, all with a mathematical bent. Designed for primary to early high level.

PC8018 WIZQUIZ MATHS TUTORIAL: Comprehensive competitive exerciser for arithmetic for all levels from infants to high school. The program allows you to select your level and type of questions you need practice on. Types of problems range from simple additions, to divisions with fraction remainders, decimals and percentages, and complex reciprocals with fraction reduction. The program keeps score for you and provides data on average score, best score etc. on file for the parent to check.

PC8020 CALCULUS TUTOR: Good program for those ready to learn calculus and other forms of more advanced mathematics. The program provides revision on trigonometry, algebra, exponents, inequalities, and more. For high school students and those entering tertiary courses in maths.

PC8021 ALGEBRA TUTOR: Professor Weissmans Algebra tutor program is a great way for high school students to learn algebra. Covers inequality, order of operations, and exponents, plus more.

PC8022 THE EQUATOR: Good equation learning aid for late primary and early high school level. The program helps the student learn the function, use, and application of various general purpose formulas used in the fields of Maths, Finance, and Science.

PC8050 CHEMICAL: Molecular modelling program to aid in the formation of three dimensional diagrams of chemical molecules. Shows the shape and structure of the molecule on screen along with relevant information.

PC8051 VIDEOCHEM: Educational game for secondary students studying chemistry. Teaches chemical valences and bonding in an interesting and fun way.

PC8080 WORLD DATABASE: Database of demographic and statistical information on the world extracted from the Encyclopedia Britannica and other sources.

PC8081 WORLD 2: Good geography education program. Draws a map of the world on screen and lets you zoom in on places of interest to see more detail. Areas of interest can be defined by name, or geographic location.

PC8090 WORD PART: Program designed to help enhance your word power. It has a database of 500 word parts, and 2000 related words with concise definitions. Designed for older teenagers, but useful for all ages.

PC8095A TRIVIA MACHINE DISK 1: Educational game based on the Trivial Pursuit type board game. you select one of four categories, and also select your level of play. You are then given 20 multiple choice questions to answer against the clock. Good fun for all ages. Requires PC8095B.

PC8095B TRIVIA MACHINE DISK 2: Second disk of TRIVIA MACHINE program. Requires PC8095A.

PC8100 JAPANESE TUTORIAL: Tutorial program designed to teach Japanese vocabulary, grammar, and culture. Provides questions in multiple choice, fill in the space, and matching formats.

PC8101 CHINESE CHARACTERS: Good tutorial program on how to write Chinese characters stroke by stroke. Covers numbers and several Chinese words.

PC8110 HEBREW QUIZ: Introduction to biblical Hebrew language with tutorial and testing sections. Includes graphic representation of Hebrew characters and words on screen.

PC8120 FRENCH VERB CONJUGATOR: Easy to use memory resident utility conjugates 201 French verbs in the present, preterite, imperfect, conditional, subjunctive, and future tenses, plus compound tenses.

PC8121 SPANISH VERB CONJUGATOR: Excellent program conjugates 201 Spanish verbs in the present, preterite, imperfect, conditional, subjunctive, future, and compound tenses.

PC8130 ITALIAN TEACHER: Program designed to help you learn and practice basic Italian. The program covers vocabulary, translation practice, verb conjugation, and more. Provides test results and help.

PC8140 DRILLS IN SPANISH: Spanish language tutorial for serious students and teachers of Spanish. Covers the basics of the Spanish language in a drill type program.

PC8200 BOOK REPORT: This program asks the user questions about a book they have read. The questions are grouped into six major areas; (library information, Setting, Main Character, Supporting characters, Main Scene, and Feelings about the book.) The user is allowed one line per answer, with the option of adding a second line. The objective is to get the students to think specifically about the book. From this information the program will produce a skeleton book report which will aid the student to produce their own book report.

PC8400 LETTERFALL: Learn to type whilst playing the letterfall game. Program has 16 levels and is suitable for beginners and advanced users alike. Type the falling word or letters as fast and accurately as possible.

PC8401 PC-TOUCH: Program designed to help you practice your touch typing. Provides valuable statistics as you type including accuracy, speed in words per minute, and keystroke counts.

PC8402 FASTYPE TYPING TUTOR: Good touch typing tutorial for all levels. Starts with the basics, and progresses to advanced typing skills.

PC8403 TOUCH TYPING TUTORIAL: Touch typing tutorial program with a number of good features. Program includes Teach mode with 8 graduated lessons to actually teach you to type. Also included is a Game mode which adapts to the typists skill, forcing the user to type faster whilst enjoying an interesting game. Finally a Speed mode allows you to test your typing speed and accuracy. Also included are a number of practice files specific to legal and medical needs.

PC8404 QUICKTYPE: Game type program designed to help polish your touch typing skills. Use any ASCII text file to practice your typing on, and select your typing standard. The program provides feedback on your accuracy, your speed for the last sentence, and your average speed. As your speed increases so does the game speed.

PC8450 MEDICAL SIMULATION: Educational program for testing paramedics, medical students, and doctors. In the program you are presented with treatment alternatives in emergency situations and must select the correct course of action. Excellent tutorial for those involved in medical field.

PC8451A ECG TUTOR DISK 1: Educational program for medical personnel. Aids in the learning of basic Electro Cardio Graph interpretation using graphic representation of the ECG strips. Provides instructional information, as well as questions on the various ECG traces. **Requires PC8451B.**

PC8451B ECG TUTOR DISK 2: Second disk of ECG TUTOR program contains documentation and data files. **Requires PC8451A.**

PC8500: EXTOL: Programming language designed for Computer Aided Instruction which is particularly well suited for non mathematical domains. Includes number of sample files and can also handle graphics. Good for teachers.

PC8501 TEST: Program designed to display your questions, accept valid answers, and reject inappropriate ones, and then show the correct answer with an optional comment if required. At the end of the test provides an optional evaluation of the results.

PC8503 QUIZGEN: Quiz generating program will create a randomly selected quiz from a master file of up to 150 questions. Different master files can be kept on different subjects. The program allows you to view both the master file and the selected quiz as well as printing out the quiz and the answer key.

PC8504 PC QUIZZER: Computer Aided instruction package that allows you to create lessons easily which can be presented to the students using windows which contain options, questions, answer prompts, and help. Graphics and music can easily be added. Quizzes are entered by using a standard ASCII word processor or text editor. Includes a number of sample quizzes.

PC8505 COMPUTER AIDED INSTRUCTION: PC-CAI is a computer language specifically designed to allow you to create computer driven tutorials, tests, and demos. It works much like a word processor. You enter your information using the programs built in editor, along with the various commands, and the program produces a ready to run application. Allows you to integrate text and graphics to produce great lessons and demonstrations.

PC8600 GKAL GRADE PROCESSOR: Teachers aid for totalling and doing various manipulations to students' scores. Program takes numerical grades entered via an ASCII text editor also included on the disk, and calculates totals and averages using multipliers or weights if required, and produces printed reports and histograms of results.

PC8601 THE GRADING ASSISTANT: Program designed to help teachers record students' grades throughout a period and easily produce student and class average reports. Various marks can be weighted, letter grades assigned, and even produces class roster reports for attendance checks.

STATISTICS/MATHS

PC8800 MTOOL: Mathematical function interpreter. Using almost any well behaved mathematical function of a single variable program will evaluate the function for any value or range of values of the independent variable, numerically integrate the function, evaluate the derivative of the function for a given value, find solutions and even plot the function.

PC8820 CURVEFIT: Program performs least squares curve fit on X, Y data. Curves for 25 equations are fitted. Equation coefficients, correlation coefficient, and best fit are computed.

PC8821 DATAPLOT: General purpose two dimensional data plotting system designed for scientific and engineering applications. Simple menu driven interface allows for easy scientific data analysis and presentation. Options include a number of different chart types, plots up to 10 curves on a single graph, and supports most adapters and plotters. Requires DOS 3.0 or higher and plotter for output.

PC8822 XY DATA ANALYSER: XY is a package that combines data analysis and graphic presentation. Particularly suited to laboratory applications it can be readily applied to any application requiring linear graphics. It allows for data entry and selection, curve fitting and calculation, plotting data and curves, and more.

PC8823 PWRSTAR: Numerical data analysis program. Provides a polynomial best fit to a given set of data. Will provide automatic display of input and the fitted curve. Two versions on disk, one for standard machines, and one for machines with a maths coprocessor chip.

PC8824 MATHPLOT: Set of graphics aided programs designed to help scientists and engineers analyse data. Routines are included for least square fitting polynomials to sets of data points, solving simultaneous linear equations, numerically integrating a curve defined by a set of data points, calculating simple statistical parameters for data sets, and for calculating the coefficients of a Fourier series for a periodic function described by a set of data points. Programs are also included for calculating and plotting Fourier Spectra and Bessel functions. Graphics are used and are suitable for all graphics systems.

PC8840A KWIKSTAT DISK 1: Graphics oriented scientific statistical analysis program. It can import ASCII and dBase files as well as building its own database. Menu driven, able to produce histograms, scatterplots, 3-D Bar Charts, and box plots as well as computing most statistical functions. **Requires PC8840B.**

PC8840B KWIKSTAT DISK 2: Second disk of KWIKSTAT program. **Requires PC8840A.**

PC8841 EPISTAT: Collection of programs written in BASIC for statistical analysis of small to medium sized data samples. More than 40 common statistical tests are performed by the programs included. These include students T test, rank sum test, linear regression, and correlations, plus standard statistical functions.

PC8842A SUPERSTAT DISK 1: Statistical package designed for analysing the results of market surveys and polls. The analysis provided is very complete. Up to 25 variables and 50 data columns are allowed. Graphics are provided in the form of bar and scatter charts. **Requires PC8842B.**

PC8842B SUPERSTAT DISK 2: Second disk of the Superstat package. **Requires PC8842A.**

PC8843 PROTAB STATISTICAL CALCULATOR: Easy to use statistical calculator for fast quantitative analysis of small data sets. The tools available include single and paired distribution, ANOVA, correlation and regression, and crosstab analysis. No programming required, just enter the data and PROTAB does the rest.

PC8890 CONVERT: Program performs unit conversion for mass, length, area, volume, force, pressure, density, energy, work, power, and others.

RELIGION

PC8900 BIBLE-Q: Quiz type game designed to challenge your factual knowledge of the Scriptures. Educational as well as fun. Covers Old Testament, New Testament, Geography, and Life of Jesus.

PC8901 BIBLEMEN: Educational game that teaches you as you play. You are given hints and you have to choose the right person.

PC8902 BIBLE STUDY HELPS: Menu driven text summary of a number of bible topics including parables and miracles of the bible, harmony of the gospels, and old and new testaments.

PC8903 JESUS SAYS: Interactive program that carries on a "conversation" with the user. It has an adjustable reading speed for slower readers. The user is prompted to enter a sentence and the program responds with a quote from the bible.

PC8906A BIBLE QUOTES DISK 1: Wordworker, a comprehensively cross referenced file of the New Testament. Almost 8000 verses are included with almost 15000 cross references. Requires PC8906B.

PC8906B BIBLE QUOTES DISK 2: Second disk of the Bible Quotes program. Requires PC8906A.

PC8907 PROBLEMS: Bible cross reference index that offers numerous Bible verses including the book, chapter, and verse, on a wide range of topics, especially common problems. You can display, print, add to, or delete verses as you like.

MUSIC

PC9000 COMPOSER: Graphics based music editor. Allows you to compose, edit and play musical scores easily and actually see the score on screen, and print it to a dot matrix printer.

PC9001 PIANOMAN V4: Excellent update on the already great PIANOMAN program. This program turns your keyboard into a electric piano. You can play your tune, record and edit it, insert and delete notes, adjust pitch and length, make global changes, and save/retrieve tunes. The program can produce tunes with up to 63,488 notes on a 640K system. Includes some sample tunes.

PC9002 PIANOMAN TUNES: Collection of great tunes for our Pianoman program. Over 50 files including some macros to use with the program. Tunes include Entertainer, William Tell Overture, Battle Hymn and many more!

MISCELLANEOUS

PC9100 CAMBRIDGE THOROUGHbred HANDICAPPER: Program designed to help you handicap thoroughbred horses using information available in the racing form. Helps you improve your performance on the track.

PC9105 DOODAH RACE HANDICAPPER: Professional horse race handicapping system to help you better your chances at the races. Takes into account large number of variable sin determining a horses handicap, and chances.

PC9200 DIET FOR MONEY: Diet planning program which allows you to enter food type and provides information on calorie, carbohydrate, fat, protein, and cholesterol value. Also provides dietary tables and weight/height tables.

PC9201 NUTRITION ANALYST: Program allows for complete nutritional analysis of various types of foods and diets in terms of protein, carbohydrates, fats, cholesterol, fibre, and 15 essential vitamins and minerals. It also produces a customised diet and RDA analysis for an individual based on information entered.

PC9202 SLIMMER: Program designed to help you lose weight. The program calculates your ideal weight from data you enter, calculates your ideal calorie requirement, helps keep track of your weight and plots your progress, and provides you with an extensive look-up data base of food types with their corresponding calorie values. Program uses pounds, feet and inches, and calories.

PC9210 CHEF TELLS: Computerised cooking class which lets you learn at your own speed. Teaches the essentials of cooking as well as various recipes.

PC9211 PIZZA RECIPES: Collection of pizza recipes which range from how to make the dough to some exotic toppings with a number of handy hints.

PC9212 EDNA'S COOKBOOK: Program for recording, filing, listing, and printing recipes. Essentially, it is the electronic equivalent of the cookbook. The program may also be used in the preparation of cook books for publication since it facilitates organisation and printing.

PC9213 FAMILY COOKBOOK: Program provides you with an easy to use system to keep track of your favourite recipes. The first screen shows various categories of dishes, from appetizers through desserts. There are also sections for drinks and for kids. You select a category and the names of the recipes are displayed. Select a recipe and the recipe card is displayed, or you can enter your own recipes.

PC9214 COMPUTER BAKER: Collection of recipes for pies, cakes, cookies, and snacks to view on your PC and bake. Recipes include brownies, chocolate chip oatmeal bars, date bars, fudge, bran muffins, and many more.

PC9220 PC BARTENDER: Fun program provides drink recipes for about 200 drinks and will automatically convert some of those to their non alcoholic version. Recipes adapt to the number of servings required and you can search by drink name or type of alcohol, or by other ingredient.

PC9250 BACH FLOWER REMEDY FINDER: Program helps you find the correct Bach Flower Remedy for a number of ailments. Unlike conventional medicine, Bach Flower Remedies use a holistic approach to healing, and depend more on the persons emotional characteristics than their particular symptoms. Interesting program, but we cannot vouch for its effectiveness.

PC9300 ASTROLOGY: Excellent program allows you to calculate zodiac sign positions of planets, sun, and moon, as well as cusps. Displays chart as graphic cartwheel format, supports many astrological functions, and can save charts for future access. Even searches files stored for compatible matches.

PC9310 PLANETS: Program computes information relating to position, distance, magnitude, orbit view, skyview, etc for the major planets, four minor planets, or Halley's comet on a specified date or time.

PC9311 STARFINDER: Good astronomy program which shows the stars and the constellations and allows you to show them on the screen with either their scientific or common names.

PC9312 SOLARISM: Great package that provides a graphic representation of the sky and solar system from any position on Earth. Provides view of sky from ground or solar map. Allows you to search stars and constellations for objects and to change perspective to any planet. Very good.

PC9313A ACE DISK 1: Astrosoft Computerised Ephemeris. An excellent general purpose astronomy package consisting of three parts including calculating astronomical calculations, data for planets and satellites, and data on deep sky objects. Requires PC9313B.

PC9313B ACE DISK 2: Second disk of ACE program. Requires PC9313A.

PC9314 SKYPLOT: Program simulates many of the operations of a Planetarium. When given a date and time, a position, and a direction, the program will produce a plot of the sky. The plot will contain the Sun, Moon, and planets, and most of the stars. Once a plot is produced one can change the parameters, and print the plot.

PC9315 STARVIEW: View the stars and planets on screen with this program. Can be used with keyboard or mouse if present. Allows you to display stars by spectral class or magnitude, as well as by constellation. You can select time, location, declination and Ascension easily, and zoom in and out of the display. You can select objects by name, Yale Catalogue Number, or position, and more. Suitable for all graphics video displays.

PC9350 NUMEROLOGY: By The Numbers is an interesting program that uses the theory of numerology determine a person's personality, strengths and weaknesses, relationships and more. Can store the file for future reference.

PC9351 PALM READER: Interesting program were you answer questions about the lines on your palm and the program predicts your future from your palm.

PC9354 MAYAN CALENDAR: Program uses the astrological system of the Ancient Mayans to convert a modern calendar date to its Mayan equivalent, and then give an astrological interpretation based on ancient Mayan astrological techniques. It provides on screen information, and a printout of your horoscope.

PC9355 CRYSTAL BALL: Program emulates a "psychic" computer. It generates predictions about the future, and answers your questions. However unlike human psychics CRYSTAL BALL is honest. It generates its predictions entirely at random, and it makes no claims for accuracy. Fun program.

PC9370 BIOLOTTO: Program designed to help you pick your lotto numbers based on your personal biorhythms. After analysing your chances of success based on your biorhythm for the day of the lotto draw, it will generate number selections for you based on numbers that it deems to be "good" for you.

PC9380 LOTTO MAGIC WHEEL: Program designed to use the principle of "wheeling" of a selection of numbers to increase your chances of success. You select a set of numbers and the program determines the most efficient way of covering combinations of those numbers. The author claims that by using the wheeling principle you can help improve your odds of winning at lotto.

PC9400 CARSIGN: Program designed to print those cute diamond shaped carsigns which have become so popular. Enter your own text and produce your own signs quickly. Supports Epson compatible, Proprinter, and HP Thinkjet printers.

PC9410 CASSETTE! Editor program specifically designed for creating paper inserts for audio cassettes. Also allows you to number the songs on each cassette. Includes EGA version.

PC9415A MOVIES DATABASE DISK 1: Database of hundreds of movies with information about the actors, the movie and more. Includes search utility to let you easily find the movie you want. Requires PC9415B.

PC9415B MOVIES DATABASE DISK 2: Second disk of Movies database program. Requires PC9415A.

PC9420 DO IT YOURSELF PROMO: Create your own on screen Christmas and birthday greeting to any one you like using this program. Incorporate graphics, music, and text and send a greeting with a difference to any other PC user.

PC9450 PERSONAL GOLFCARD: Keep track of your golf scores using this interesting program. Produces a number of reports based on the data you input.

PC9460 PC-RUN: Designed to help analyse data kept by runners in their log books. Helps organise and maintain training schedules and plans and even graphs the results of your training.

PC9461 GRAPHICS COACH: Program designed for serious runners to help monitor their training, compare current training to past progress, and help plan their training to improve future fitness and race performance. Even gives graphic representation of your results.

PC9470 MORSE CODE TRAINER: Good program for those learning Morse code or who wish to brush up their Morse code technique. Allows you select a speed to practice at and even generates its own test sessions.

PC9500 ESIE EXPERT SYSTEM: Expert System Inference Engine. An "artificial intelligence" expert system shell. You can build custom "knowledge bases" that can be used to aid in making decisions and such like.

PC9510 INSANITY: Interesting program designed to introduce you to artificial intelligence. You must teach the program how to respond to various questions and from there it can develop the ability to carry out its own conversations.

PC9600 HANDWRITING ANALYST: Interesting program that allows you to analyse signatures. You are prompted for information about the signature such as size, underlining, connectedness, pressure etc. and it then produces a report on the signature's writer.

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